THE IRON TRADE REVIEW

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Great Rush of Specifications to Chicago Mills

Buyers Anxious to Insure Place on Rolling Schedules—Orders for Cars Make a Large Aggregate—Some Shading on Southern Pig Iron

The Chicago district at present takes the lead in activity in finished lines. Specifications are being received by Chicago mills at a truly remarkable rate for this time of the year. Many consumers who were disappointed in not getting deliveries as expected during the past six months are now coming in with their specifications in order to insure a place on rolling schedules as early in next year as possible. Similar reports as to specifications come from nearly all other centers, but, as noted last week, there is some decrease in new buying. A number of price advances have been made in the past few days. The situation as a whole is highly satisfactory.

The iron pipe manufacturers have decided to adopt the new steel tube classification put out several weeks ago by the National Tube Co. and other leading steel pipe makers. The iron pipe manufacturers are now preparing a new card of discounts based on the new list and this will be issued about Jan. 1. The adoption by the iron pipe makers of the steel tube classification is to effect a standard classification for the trade and to avoid confusion in quoting.

Iron Ore

The iron ore receipts at Lake Erie ports during the season of 1912 were 38,624,108 tons, an increase of more than 4,500,000 tons, compared with the previous record year, 1910. Lake Erie docks, on Dec. 1, held 9,494,625 tons, the largest tonnage on hand on the first of December of any year in the history of the traffic. A number of contracts have been made to haul iron ore from the head of the lakes at 40 cents net per ton, an increase of 5 cents over last year, and it is practically assured that 45 cents will be the prevailing rate, although one Cleveland firm will ship ore in its own boats at 40 cents. There is a lull in ore buying at present, following the heavy orders which were placed for both Bessemer and non-Bessemer grades.

Pig Iron

The strength of the pig iron market is fully maintained except in southern territory, where an increasing tendency to sell at $13.50 for No. 2 Birmingham, for early delivery, is manifested. The sales of the week in the Buffalo district amounted to from 15,000 to 20,000 tons, and included sales for third quarter and last half delivery at advances of from 25 to 75 cents per ton over the first half price. Eastern makers of low phosphorus pig iron have about 100,000 tons on their books for next year's delivery, including some for delivery throughout the year. There is, however, no general interest in the pig iron market for delivery after July 1, of next year. A St. Louis consumer of basic has purchased 5,000 tons in the Chicago territory. In the Philadelphia territory, the largest lots are being taken by cast iron pipe makers. One Delaware shop took 5,000 tons. The Norfolk & Western is closing for 5,000 tons of various foundry grades. Although carload lots of foundry grades have sold in the valley at $18, the general price is $17.50, valley.

Railroad Buying

Railroad buying continues active. The Harriman lines have closed for about 200,000 tons of rails, of which about 135,000 have been awarded to mills of the United States Steel Corporation. The remaining tonnage is divided between the Pennsylvania Steel Co. and the Colorado Fuel & Iron Co. Part of an order of 100,000 tons of rails for Brazil has been taken by American mills. The United States Steel Products Co. has taken 3,000 tons of girder rails for export to Belgium. The receiver of the Wheeling & Lake Erie has been authorized to buy 1,500 freight cars and 20 locomotives. Orders for about 12,000 cars are pending in the Chicago district. Car orders for the week aggregate 13,000. The New York Central is understood to have placed some additional orders and is still in the market for a large number of cars. The Baltimore & Ohio has placed an order for an additional 1,000 hopper cars and the Norfolk & Western has awarded 1,000 hoppers to the Ralston Steel Car Co.

Sheets

The American Sheet & Tin Plate Co. last month broke all previous records for shipments and new orders. Some independent makers of sheets have withdrawn quotations and the entire sheet situation is very strong. The leading interest in November also exceeded all previous monthly records, except one, in shipments and new orders of tin plate, and nearly all tin plate mills in the Pittsburgh district broke previous records last month.

Coke

Although a number of merchant furnaces are anxious to blow in, they are showing a disposition not to pay the high prices asked for contract coke. The lowest quotations now being made are $3.25 for furnace coke for delivery throughout next year and $3.50 for first half delivery.

PITTSBURGH

Specifying Heavy, Buying Decreased

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Dec. 17.

Although contracting is not so heavy as it was a fortnight ago, much to the relief of the congested mills, specifying has not fallen off to any extent, according to advice from the leading iron and steel manufacturers in this district. There is a slight difference of opinion expressed by steel company officials regarding the immediate future. A number of officials do not believe that demand will fall off to any great extent at the end of this or the beginning of next year; several other manufacturers, on the other hand, believe the trade will experience a natural lull the latter part of the month and the first few weeks of January.

The leading interest continues to offer steel bars at 1.40c and steel plates and structural shapes at 1.45c, and when specific work is involved, little or no consideration is given regarding the time of deliveries. Several of the independent mills are selling beyond July, not because they formally opened books for third quarter delivery, but rather because of the fact that they are unable to promise additional tonnages for first half shipment.

One of the independent sheet makers, with mills in Ohio, has withdrawn prevailing quotations, and is quoting blue annealed and galvanized products $2 a ton above prevailing prices and black sheets $1 a ton above quotations offered by the American Sheet & Tin Plate Co. and several independent manufacturers.

The pig iron market has been quiet. Coke has not developed the strength that many believed it would display immediately before the holiday season, although there is some indication that contract coke will go above $3.25, ovens.

Pig Iron.—The pig iron market has been unusually quiet the last seven days, and many in the trade believe that active buying will not be renewed until after the end of the year. Several of the heaviest consumers in this and adjacent districts entered the market rather informally about 10 days ago for steel making iron. It is now understood that these interests have quietly withdrawn tentative inquiries. The purchase of the Pittsburgh Steel Co., 10 days ago, about which so many conflicting statements have been printed, involved 35,000 tons of basic pig iron, 30,000 of which were obtained at $16.35, valley, through a Youngstown interest, to be shipped the first half of 1913. The remaining 5,000 tons were secured through one of the leading local brokers at $16.50, valley, for December shipment.

Blast furnace representatives advise that consumers are urging shipments, and some embarrassment has been experienced because of deferred deliveries. In nearly every instance, melters are asking additional tonnages. Small lots of No. 2 foundry continue to bring $18, valley, for prompt delivery, but the general market has not gone above the $17.50, valley, mark. A week ago, it was believed basic had reached the $17, valley, mark. Just at present, $16.50 seems to represent the market more fairly from a standpoint of actual sales. We quote all grades as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$17.25
Bessemer, Pittsburgh	18.15
Basic, valley	16.50
Basic, Pittsburgh	17.40
No. 2 foundry, valley	17.50
No. 2 foundry, Pittsburgh	18.40
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.00 to 16.50
Gray forge, Pittsburgh	16.90 to 17.40

Ferro-Alloys.—The market for ferro-alloys is rather quiet. Several sellers of ferro-manganese are now quoting $70, seaboard, for first half delivery although the $65 quotation has not been withdrawn. Small lots of ferro-manganese have sold as high as $82, seaboard. Ferro-silicon, 50 per cent, continues to be quoted at $75, Pittsburgh, for prompt and forward delivery.

We quote 80 per cent ferro-manganese at $73 to $75, Baltimore, for prompt delivery and $65 to $70 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Although it is generally reported that mills are selling plates through the second half of the year, books have not been generally opened for delivery after July 1. The leading interest continues to quote 1.45c on specific work, some of which will not begin until second half. Other companies advise that they are taking tonnage to be delivered at the mills' convenience and much of this material will not be shipped until the third quarter.

The receiver of the Wheeling & Lake Erie railroad has been authorized to purchase 1,500 cars of miscellaneous types. Interest is taken in a lift bridge to be built by the Lake Shore & Michigan Southern railroad over the Calumet river, near Chicago. About 2,000 tons of steel, including 600 tons of nickel steel, are involved. We quote plates as follows:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.60c for shipment after Jan. 1 and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—All previous records were broken by the American Sheet & Tin Plate Co. last month from the standpoint of shipments and new orders. Heavy tonnages were shipped to all parts of the country and consumers displayed an unusual desire to cover future requirements. As announced in last week's issue of THE IRON TRADE REVIEW, the leading interest and most important independent sheet manufacturers opened books for second quarter shipment about 10 days ago. Since that time unusually heavy tonnages have been booked, and the first two weeks of this month had not witnessed any falling off in new demand.

Despite the fact that consumers believed that prices would be advanced before second quarter tonnage was accepted, most important manufacturers deemed it unwise to quote on the higher basis. All serviceable sheet mills are operating at maximum capacity, although the shortage of raw material has curtailed production considerably. Some of the smaller independent mills continue to enjoy fancy prices for prompt material.

We quote for prompt delivery: No. 10 gage blue annealed $1.80 to $1.85,

No. 28 gage black $2.35 to $2.40, and No. 28 gage galvanized $3.55 to $3.60. Prices for delivery through the first half of 1913 follow:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes. Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15; No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—Nearly all of the tin plate mills in this district broke all previous November records last month. The leading interest exceeded all previous monthly records except one, from a standpoint of shipments and new orders. Inasmuch as heaviest consumers already have covered next year's needs, new orders are rapidly falling off. We quote tin plate as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material. — The buying of steel rails has not fallen off according to reports from other parts of the country, although no especially large contracts have been taken locally this week. Leading eastern railroads have fairly well covered requirements through the first six months, although it is probable that initial purchases will be supplemented shortly.

Leading traction line interests have not yet figured in the market for next year's requirements. Although individual traction company orders are not especially heavy, they represent a good volume of business in the aggregate.

Spikes show a tendency toward higher prices, although the 1.90c quotation has not been withdrawn. Spikes continue to be in good demand and all of the makers are a couple of months deferred in deliveries. Rails are quoted as follows, with the base price of open-hearth sections at 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	1.90c to 2.00c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars. — Several printed reports to the effect that the Carnegie Steel Co. had fixed the prices of first quarter sheet bars have proven to be erroneous. It is understood that an offer of about 30,000 tons of open-hearth billets for first quarter shipment has been made at $29, Pittsburgh, although so far as can be learned this tonnage has not been purchased. One of the local consumers advises today that a contract for open-hearth billets was closed a short time ago at $28, and Bessemer billets have sold 50 cents above the prevailing nominal quotation. Revised prices follow:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.50, with the usual extra for size and analysis, and open-hearth rolling billets, $28.00. Bessemer sheet and tin bars are quoted at $28.00 and open-hearth sheet bars are quoted $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $34.00, Pittsburgh.

Hoops and Bands.—Manufacturers no longer are offering the 1.50c quotation on steel hoops and it is no longer probable that this product can be obtained at less than 1.60c. As high as 1.70c is being quoted on small tonnages. Steel bands continue to be quoted at 1.40c. Demand for both products is fairly heavy. Revised quotations follow:

Hoops in carload lots, 1.60c to 1.70c, Pittsburgh, in less than carload lots, 1.65c to 1.75c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars. — Several of the manufacturers of steel bars are selling into third quarter. Although books have not generally been opened beyond July 1, a number of mills are unable to promise deliveries until after that time. The 1.40c quotation continues to be offered.

Bolt and nut makers are placing rather heavy tonnages and automobile, agricultural and shafting interests continue to figure prominently in the market. Although iron bars have not been changed, many in the trade believe that the 1.70c quotation is rapidly disappearing. It is practically impossible to obtain either steel or iron bars for prompt delivery. Cold rolled shafting continues to be quoted at 60 per cent off for carload lots and 55 per cent off for less than carload lots. Quotations follow:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—The market for muck bar continues quiet and we quote this product at $32, Pittsburgh.

Bolts, Nuts and Rivets.—Rivet makers have advanced structural and boiler rivets to $2 a ton, although several manufacturers will not put new prices into effect until Jan. 1. Nut and bolt manufacturers, following the lead taken by eastern makers have adopted new discounts showing advance of 2½ per cent. It has been decided to sell nuts and bolts on 30-day instead of 60-day contracts. Demand for the products continues heavy and few manufacturers can promise material until February. Revised quotations are:

Rivets

Button head structural rivets, 2.10c to 2.20c; cone head boiler rivets, 2.20c to 2.30c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½ inch and smaller, $7.20 off.

Structural Shapes. — Some of the companies are selling both plates and shapes for delivery after July 1, although in most instances companies have not formally opened books beyond the first half. It has been impossible, however, for some of the mills to promise delivery until the third quarter. Prices for delivery beyond July 1, have not been advanced. Fabricators advise that no large contracts have been taken this week and it is not probable that active buying of structural material will begin again until after the close of the year.

The leading interest continues to offer the 1.45c quotation. The Jones & Laughlin Steel Co. is quoting plates and shapes $2 a ton above steel bars, which are listed at 1.40c. Several other independent manufacturers are refusing to shade 1.55c and 1.60c for forward delivery. Quotations are as follows:

Standard structural shapes, 1.45c to 1.60c, for shipment after Jan. 1. For extras see card of Sept. 1, 1909.

Merchant Pipe. — Several rather interesting inquiries for steel pipe

have come out the last few days. The Hope Natural Gas Co. is negotiating for 180 miles of 12-inch line pipe for West Virginia shipment, and there is an indefinite inquiry in the market for about 100 miles of 16-inch pipe for California shipment. The United States Steel Products Co. has taken an order for about 600 miles of pipe for shipment to Roumanian oil fields and the National Tube Co. will begin making deliveries after Jan. 1. The order involves 1,970,000 feet of 5-inch; 290,000 feet of 9-inch and 689,000 feet of 10-inch steel pipe, being larger than the Calgary order earlier in the year.

Several manufacturers of iron pipe have signified intentions of manufacturing pipe on steel pipe schedules of weights and list prices after Jan. 1. Iron pipe weighs 2 per cent less than steel, and it is probable that iron pipe, after the first of the year, will be decreased slightly in inside diameter. Discounts, under present plans, will not be changed. Inasmuch as new discounts on steel pipe will not become effective until Jan. 1, we continue to offer the old discounts to jobbers, which are subject to the usual preferential discount to the large buyer:

Iron and Steel Pipe Basing Prices.

STEEL.

	Butt. Black.	Butt. Galv.	Lap. Black.	Lap. Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch	..	..	78	70
7 inch to 12 inch	..	..	76	66
13 to 15 inch	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch	77	71	..	..
2 to 3 inch	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch	..	..	76	68
4½ to 6 inch	..	..	75	67
7 to 8 inch	..	..	68	58
9 to 12 inch	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch	66	60	..	..
2 to 2½ inch	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch	..	..	66	60
4½ to 6 inch	..	..	65	39
7 to 8 inch	..	..	58	48

IRON.

⅜ inch	66	47	..	..
½ inch	70	57	..	..
¾ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—The National Tube Co. has issued a corrected list of discounts on boiler tubes to become effective Jan. 1. Discounts are based on the new list prices and sizes are grouped slightly different than provided in the old card. The net prices have remained practically the same. Discounts offered at present are:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch	62	47
2½ inch	64½	52
2¾ to 3¼ inch	69½	54½
3½ to 4½ inch	72	57
5 and 6 inch	64½	..
7 to 13 inch	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Products. — The American Steel & Wire Co. notified the trade of a $1 advance in the price of wire products Dec. 14 and wire nails are now being uniformly quoted at $1.75 and plain wire at $1.55. The Jones & Laughlin Steel Co., on Oct. 14, adopted the $1.75 quotation for nails and several other independent mills also changed prices at that time. The leading interest, however, maintained quotations in effect from August 26.

Wire products have been advanced four times during the year, an advance of $1 each being made on the following dates: March 11, July 22, Aug. 26 and Oct. 14. Galvanized mill products were advanced $2 a ton Oct. 12. When the year opened, nails were uniformly quoted at $1.55. At the present time wire products are being quoted $5 a ton higher than they were a year ago.

Last year prices of wire products changed six different times; two advances of $1 each were announced the early part of the year and four reductions of $1 each were made the last three months of the year. This comparison goes to indicate the strong position of the market this year in relation to the market of 1911. Revised quotations follow:

Wire nails, jobbers' carload lots, $1.75, retailers' carload lots, $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.55; and to dealers, in carloads, $60; polished staples, $1.75; galvanized staples, $2.10.

Wire Rods.—No sales of wire rods have been made for several weeks and many believe that the $30, quotation, which became effective several weeks ago, is now a nominal one. Representatives advise that they would not offer products at any price without first consulting company officials. In the absence of sales, we quote both Bessemer and open-hearth wire rods at $30, Pittsburgh.

Car Wheels.—No large orders for car wheels have been taken this week. Car wheels are quoted as follows: 33-inch freight car wheels, $15 to $15.50; 36-inch passenger train car wheels, $19 to $19.50.

Coke.—The market for spot furnace coke has not advanced as rapidly as many in the trade believed it would just before the holidays. Prompt 48-hour fuel continues to sell at about $4, ovens, and it is understood that a Cleveland consumer was able to shade that figure slightly a few days ago. On the other hand, many in the trade believe that contract coke will go above $3.25.

A consumer outside of this district is negotiating for about 15,000 tons of furnace coke a month for first half, and it is understood that quotations submitted are above $3.25 at the ovens. Foundry coke remains unchanged. There is fairly good demand for foundry coke, but prevailing prices are being maintained.

The Connellsville *Courier* for the week ending Dec. 7 says that production decreased 7,105 tons, as compared with the week before. Furnace ovens show a greater loss. Shipments decreased 238 cars. The number of active ovens was decreased by about 31 ovens. We quote as follows:

Connellsville furnace	$3.90 to 4.05
Connellsville furnace contract	3.25
Connellsville foundry	4.50 to 4.75
Connellsville foundry contract	4.00 to 4.25

Old Material. — Although several grades of scrap have declined during the last week, heavy melting steel shows a slight tendency toward higher quotations, several sales having been made at 25 cents above the prevailing market price of a week ago. Dealers believe that other stocks will develop strength after Jan. 1. Rather heavy tonnages of all grades are being offered, which is greatly responsible for comparatively low prices of today. Revised quotations follow:

Heavy melting scrap	$15.00 to 15.25
Rerolling rails	16.50 to 17.00
Malleable	14.00 to 14.25
Agricultural malleable	13.50 to 13.75
Bundled sheet scrap	13.00 to 13.50
Iron axles	26.00 to 27.00
Old iron rails	16.75 to 17.25
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.25 to 15.50
Old car wheels	16.25 to 16.50
Low phosphorus	18.00 to 18.50
Machine shop turnings	10.75 to 11.00
No. 1 busheling	14.00 to 14.25
Country mixed	11.00 to 11.25
Cast borings	10.25 to 10.50
No. 1 cast scrap	14.25 to 14.50

CHICAGO

Heavy Specifying Continues

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Specifications continue to come in at a phenomenal rate for this time of the year, and the leading interest has booked new business during the second week in December somewhat in excess of the former. The total specifications received during this week have been almost as great as some of the record weeks of the year, the average for the first two weeks of the month being larger than the corresponding period during November. A good many consumers who were disappointed in mill delivery during the past six months wish to be assured of a place in rolling schedules for the last half of the coming year and many specifications for delivery during that time have been received. All finished lines are very strong, this condition being reflected in an advance on bolts, nuts and rivets, and on wire products, the latter now being quoted in this territory on a basis of $1.75, Pittsburgh. Bar iron shows the only signs of the usual holiday dullness, one of the leading makers in this territory reporting a 40 per cent decrease in specifications as compared with the month of November. There is practically no change in mill conditions with the exception that deliveries are further advanced. Railroad activity continues and it is understood that orders for 12,000 cars are pending, which will be closed before Jan. 1.

Pig Iron.—The market is very quiet and very few sales of any consequence have been reported. Northern iron is very firm at current quotations, as the local stacks are well sold up for the first half of the year. Many consumers, including some of the largest in this territory, are still asking anticipation of deliveries, but on account of the number of such requests that have been recognized during the past few weeks, the furnaces are now being forced to refuse compliance. Sellers of northern iron exhibit no inclination to weaken, as active buying in January is expected by some of those best posted in the trade.

The market for southern iron is likewise dull and some price shading is evident. A lot of 1,000 tons of off iron for prompt shipment was sold during the week at a price understood to be in the neighborhood of $13.50, Birmingham. The scarcity of sales makes it difficult to quote the southern market, but the prevailing prices seem to be $14, Birmingham, for prompt delivery, and $14.50 for the first half. Some of the southern producers, however, may be disposed to quote better prices on competitive orders, particularly during the dull period. Inquiries appearing during the week are for very small tonnages, and no other sales of consequence have been reported.

The Commonwealth Steel Co. has placed an order for 5,000 tons of basic, the inquiry for which was mentioned previously, but the name of the seller has not been reported.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces.

	First quarter.	First half.
Lake Superior charcoal	$18.75	$18.75
Northern foundry No. 2	18.00	18.00
Southern foundry No. 2	18.35	18.85
South'n Silveries, 5 per cent sil.	.....	19.85
Jackson co. silv'r's 8 per cent.	21.90	22.40
Malleable Bessemer	18.00	18.00
Alabama basic	.....	18.85

Merchant Bars.—The market for bar iron reflects the only evidence of seasonal dullness that is apparent in this market. One of the leading producers in this territory reports that specifications for the first two weeks of December show a decrease of 40 per cent as compared with the November rate. Prices, however, are very firm, the minimum being 1.57½c, and the larger part of the business is going at 1.60c. Hard steel bars are scarcer and the market is more accurately represented by the higher quotation. Specifications for soft steel bars are holding up well, and considerable business is being taken, involving, however, far advanced deliveries.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.57½c to 1.62½c, hard steel bars, rerolled, 1.65c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—Many specifications against second half contracts for this material have come in, consumers preferring to be assured of a place in rolling schedules rather than to risk encountering delayed deliveries, as has been the case during the past year. Considerable new business is being booked, which further complicates the delivery situation. Independent producers in this territory are still maintaining a firm attitude against second half business. Some fair structural contracts were placed during the week, including 3,600 tons taken from the St. Louis & San Francisco Railroad Co. by McClintic-Marshall and Virginia Bridge Co. The Cambria Steel Co. has taken 1,614 tons of channels from the Illinois Central Railroad Co., and the American Bridge Co. has taken 900 tons from the St. Louis & San Francisco Railroad Co. for deck plate girders and machinery. The Chicago, Rock Island & Pacific Railway Co. has placed a contract for 132 tons of shapes for the construction of two 300-ton coaling stations in Iowa. The By-Products Coke Corporation, South Chicago, has let a contract for 104 tons of structural material for steel buckstays, and also for 115 tons for an unloading tower. The contracts aggregate 6,465 tons.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—While some additional rail tonnages are pending, no further orders have been reported in this territory. The mills continue to be flooded with specifications for track fastenings, which are keeping pace with rail buying. Prices are very firm, especially on track fastenings, which are even stronger than they were a week ago.

We quote, light rails, f. o. b. Chi-

cago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspection.

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—Specifications for plates continue to be received at a surprising rate, and leading producers in this territory report a total but little less than the record weeks of the year. Railroad buying is still active, and it is reported that notwithstanding the usual expectations of inactivity at this time, orders for 12,000 cars are pending and will be placed before the first of the year. The Chicago, Rock Island & Pacific is inquiring for 500 50-ton gondola cars and the New York Central Lines have ordered 1,000 gondolas from the American Car & Foundry Co. The Chicago, Burlington & Quincy has ordered 1,500 gondolas from the same maker and 1,000 gondolas from Haskell & Barker Car Co. The Lake Shore has ordered 1,000 hopper cars from the American Car & Foundry Co.

Jobbers report an increasing demand for plates, which in many cases they are unable to satisfy, and owing to the number of car orders which have been placed, it is improbable that the market will be easier after the first of the year.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—The continued activity in this market has culminated in an advance of 2½ per cent on bolts and $2 a ton on rivets, the latter now being quoted on a basis of 2.40c, Pittsburgh. Nuts also reflect increasing strength, the discount per 100 pounds being reduced to $5.70 for squares and $6.30 for hexagons.

We quote prices on bolts, nuts and rivets, as follows:

Rivets

Structural rivets, ½ to 1¼ inches, 2.38c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ¾ x 6 inches, rolled thread, 75-10; larger sizes, 70-2½.

Machine bolts, up to ¾ x 4 inches, rolled thread, 75-10-5; cut thread 75-10; larger sizes, 70-7½.

Hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt.

Sheets.—There is no apparent change in this market, with the exception that specifications have decreased somewhat in some quarters. Independent makers are maintaining their attitude against second half business, and increasing difficulty is apparent in securing material from jobbers. Both mill and store prices are very firm.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Prices on wire products have been advanced by the leading interest, taking effect Dec. 16. Business has been keeping up unusually well, the first two weeks of December showing an increase as compared to November. Considerable business for 1913 delivery is being booked and while the remainder of the month will probably be light, a renewal of activity in all lines is expected after the first of the year.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.73; retailers' carload lots, $1.78.

Merchant Pipe and Tubes.—While there is considerable activity remaining in the market, owing to weather conditions that permit of late building operations, comparative quiet still maintains, and makers have been able to clean up their order books to some extent. The market is very firm at current quotations.

We quote store prices on merchant pipe and tubes as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch.	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¼ to 3¼ inch.....	63	48	44
3½ to 4½ inch....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—The only tonnages of consequence which have been reported consist of 1,000 tons required at St. Paul, and 3,000 tons required at Seattle. The latter was to have been closed the latter part of the week. Otherwise the market remains quiet, and current business consists of specifications for small lots.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—Practically no changes in scrap quotations have taken place during the week, the market, however, being a little nearer the minimum. Rerolling rails are still scarce, and the price differences between No. 1 and No. 2 railroad wrought are being decreased. The latter may be ascribed to several causes. No. 2 is in many cases being substituted for No. 1, and being a melting grade, can also be substituted for shoveling steel. In addition it requires but little preparation, while No. 1 must be sheared before it can be used. A further cause for this discrepancy is the fact that railroad offerings of No. 1 have been considerably in excess of No. 2.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$15.75 to 16.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.50 to 17.00
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.50 to 14.00
Shoveling steel	13.00 to 14.00

Net Tons

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	12.00 to 12.50
Arch bars and transoms	16.75 to 17.25
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
Locomotive tires	13.50 to 14.40
Dealers forge	10.75 to 11.25
Pipe and flues	10.00 to 10.50
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.25 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

CLEVELAND

High Price for First Half Coke

Office of THE IRON TRADE REVIEW, Penton Bldg., Dec. 17.

Iron Ore.—There is a lull in ore buying, following the heavy sales of both Bessemer and non-Bessemer made since the prices were fixed for the season. Some merchant furnaces in central western territory have not covered for their requirements and the buying by eastern companies is not yet ended. Iron ore receipts at Lake Erie ports during the season of 1912 were 38,624,108 tons, out of a total movement of ore by lake of 47,435,777 tons. This compares with 25,531,550 tons in 1911 and 34,042,897 tons in 1910. Lake Erie docks on Dec. 1 held 9,494,625 tons, the largest tonnage on hand in the history of the traffic, the largest previous amount having been 9,426,881 tons on Dec. 1, 1910.

The Poe lock at the Soo closed Tuesday and the two passages still to be made will be through the Canadian lock. Not a vessel was damaged in carrying final cargoes and underwriters and owners made a handsome profit on the closing business of the season. The harbor at Buffalo, where there are 53 vessels with grain cargoes aggregating 15,000,000 bushels, is very much congested.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—The market continues quiet, but a fair tonnage is being sold from day to day and prices are well maintained. Stocks at furnaces are being rapidly cleared up, and, if present prosperous conditions continue, there will be a pig iron shortage in this district before the new year is far advanced. For delivery this month and the first half of next year, we quote as follows:

No. 1 foundry	$18.25 to 18.75
No. 2 foundry	17.75 to 18.00
No. 2 southern	18.35 to 18.85
Bessemer	18.15 to 18.40
Lake Superior charcoal	19.10 to 19.75
Silveries 8 per cent silicon	21.55
Bessemer ferro, 14 per cent	29.55

Coke.—The strength of the furnace coke market has been demonstrated by the inability of the Cleveland Furnace Co. to cover for its requirements for its second stack, which it expected to blow in Jan. 1. As $3.50 was the minimum quotation for first half, the company has decided to postpone indefinitely the blowing-in of its stack. Sales of foundry coke continue in moderate quantities at full prices.

Connellsville furnace coke, $3.90 to $4.00 for prompt delivery, and $3.50 on contract: Connellsville foundry coke, $4.50 to $4.65 for prompt, and $4.25 to $4.50 on contract.

Finished Material.—The pressure for deliveries continues strong and sales agents are devoting much of their time and energy to satisfying their customers. A number of contractors are figuring on the sheet piling for the Clark avenue bridge, on which bids are to be received Dec. 19. The inquiries vary from 250 to 1,400 tons, according to the requirements of the different contractors. Bids for structural material for the city hall will be received Dec. 20. The receiver of the Wheeling & Lake Erie railroad has received permission from the courts to buy 1,500 cars and 20 locomotives. His application to the court was for permission to purchase 3,000 cars and 20 locomotives. Eastern Pennsylvania makers of shapes and plates are still able to obtain good premiums for prompt delivery, but report that demand is not quite so active as it was a few weeks ago. Cleveland plate makers are selling for fairly prompt delivery at 1.70c, Pittsburgh, for tank plates. Warehouses are doing a good business at 2.25c on shapes and plates and 2.10c on bars.

Old Material.—Taking advantage of the favorable weather, dealers have been making extremely large shipments of scrap on contract to Cleveland, Pittsburgh, Canton, the valleys and other consuming centers, leaving mills well supplied and lowering the market, which is very quiet and dull. With the holidays and inventory season at hand, this condition is expected to continue until after that period has passed. Among Cleveland plants out of the market are the rolling mills, and the two plants which consume heavy melting steel. These consumers will not re-enter the market until after the first of the year. The mill in Canton which consumes heavy melting steel is also out of the market for an indefinite period, having a large supply yet on the track. The dearth in new business has resulted in prices, which follow, being nominal:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.25 to 16.75
Relaying rails	25.00 to 26.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.00 to 14.50
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.75 to 12.25

Net Tons.

No. 1 R. R. wrought	$14.50 to 15.00
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	13.50 to 14.00
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	8.25 to 8.50
Pipes and flues	10.00 to 10.50
Wrought drillings	8.50 to 8.75
Cast borings	8.00 to 8.50
Stove plate	10.50 to 11.00
Wrought iron arch bars	17.00 to 17.50
Wrought iron piling plate	16.00 to 16.50

To Experiment With Cobalt

The mines branch of the Canadian government has engaged the services of Dr. Herbert T. Kalmus, formerly with the Massachusetts Institute of Technology, to conduct a series of experiments with regard to the possibility of substituting cobalt for nickel to produce the better grades of high grade steel as in automobile parts, gun steel, cranks, etc.; also in nickel-iron wires and steel alloys of a non-corrosive character for coins, propellers, etc. The Temiskaming, Ont., mines alone produce over 2,000,000 pounds of cobalt per year which at present goes in large part to waste.

Improvements Await Result

Dependent upon the action of the Interstate Commerce Commission in deciding the protest of the Mahoning valley manufacturers against railroad freight rates on coal, ore and coke, hinges the possibility of the Youngstown Sheet & Tube Co. constructing by-product coke ovens at its East Youngstown mills. Unless relief is offered on the rate proposition, coke ovens will be contracted for and erected. The Republic Iron & Steel Co. has already contracted for the erection of Koppers ovens.

PHILADELPHIA

More Liberal Offering of Plates and Shapes

Office of THE IRON TRADE REVIEW,
Philadelphia, Dec. 17.

Pig Iron.—The market still manifests the effect of the approaching holidays and the year's end and new buying and inquiry are light. Makers are viewing the situation with complacency because of their large bookings and in not a few cases find themselves pressed to meet the strong demand from customers for shipment of iron promptly on contract. There is a fair buying in foundry grades in well distributed lots for prompt and first quarter at $18.25 to $18.50, Philadelphia, for standard northern No. 2X and around $16, furnace, or $18.65 to $18.80, delivered, for Virginia No. 2X. The largest lots being taken in the market at present, however, are for the cast iron pipe makers. One Delaware river shop took about 5,000 tons of low grade iron for early shipment, divided between northern and Virginia makers. On some of the northern $17.50, delivered, was paid. Another pipe maker took 1,000 tons of northern low grade iron at the same net price to the furnace. The Norfolk & Western railroad is closing this week on about 5,000 tons of various foundry grades covering forward requirements. Eastern makers of low phosphorus iron who have been selling very liberally during the past several months now have an aggregate of fully 100,000 tons upon their books for next year, some of which is for delivery to very large buyers, throughout that period. Pending inquiry in low phosphorus includes 1,000 to 1,500 tons for several eastern consumers and 2,000 to 2,500 tons for a buyer in the Pittsburgh district. Standard low phosphorus metal is strong over the range of $24 to $24.50, Philadelphia. An interesting inquiry for basic to be put before eastern makers calls for 2,000 tons of high phosphorus iron for use in the basic Bessemer process of steel-making by a Scotland consumer, indicating shortages of metal in the immediate British markets. The chemical specification is quite unusual for American furnaces, and the price quoted has failed to take the business. Basic in the east is quiet. A central Pennsylvania consumer is sounding out the market and a lot of 1,000 tons for prompt shipment is pending. A New England consumer is inquiring for 2,000 tons of malleable for first half.

We quote for prompt and last quarter shipment delivered to consumers plants, in Philadelphia and vicinity as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.00 to 18.50
Malleable	19.50 to 20.00
Low phosphorus, Philadelphia	24.00 to 24.50

Iron and Steel Bars.—Requirements for third quarter and in a few cases for last half of large eastern buyers are now being covered by middle western producers at 1.40c to 1.45c, Pittsburgh, or 1.55c to 1.70c, Philadelphia. These contracts are usually confined to the largest consumers. Sizable tonnages for delivery before midyear are practically impossible of obtaining and for prompt bars smaller mills are getting from 1.85c to 1.90c, delivered this district. Additions to the plant of the American Can Co., Baltimore, will require about 500 tons of bars. Bar iron is strong with quotations extending over the range of 1.60c to 1.80c, eastern mill. There is a good run of orders.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c delivered and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from $1.85 to $1.90, Philadelphia. Shafting is quoted at 60 and 55 off in base territory.

Plates and Shapes.—Some of the Pittsburgh district makers are now more liberally offering plates and shapes to large consumers for delivery after July 1, at the range of 1.45c to 1.50c, Pittsburgh, or 1.60c to 1.65c, Philadelphia. In the majority of the cases, third quarter delivery is specified, but some all-year contracts have been taken from preferred customers. Plate deliveries are more difficult to get from Pittsburgh makers than shapes before July 1, and some mills are eliminating plate tonnage from any orders they may take for shipment by midyear. Eastern plate makers continue to quote 1.60c, Pittsburgh, or 1.75c, Philadelphia, as the contract minimum. Deliveries run six to eight weeks. Some eastern shape makers have closed their books on first quarter contracts at 1.60c, Pittsburgh, which was offered only to larger consumers. Early lots of plates and shapes are bringing 1.85c to 2c, delivered. On regular rollings, deliveries run from 10 to 14 weeks. The Norfolk & Western railroad is reported to be buying more cars. John R. Wiggins is reported to have the contract for the Penn Mutual Life Insurance Co. building, this city, about 1,000 tons. The George A. Fuller Co. has the contract for an office building in Mobile, about 400 tons. A building for the Dan River Power Co., Danville, Va., 400 tons, is up for bids.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract 1.60c to 1.75c; universal steel plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.85c; universal plates for early delivery 1.80c to 1.85c; structural shapes on contract 1.60c to 1.75c; structural shapes for early delivery 1.80c to 2.00c. Plates and shapes from store are quoted at 2.15c to 2.25c delivered.

Sheets.—The schedule of 1.90c., Pittsburgh, or 2.05c, Philadelphia, for No. 10 blue annealed, is being strongly maintained by leading eastern mills whose deliveries have now run back to six and eight weeks. New business is not so active, but this seems to be the result of makers having impressed upon the buyers their inability to make early deliveries.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.95c to 2.05c.

Semi-Finished Steel.—Most of the larger eastern buyers of semi-finished steel have contracted for their first half needs, but a few are still uncovered. One consumer is inquiring of eastern makers for a tonnage of open-hearth steel for first half, but finds sellers well sold up for first quarter. An eastern Pennsylvania rolling mill recently closed for 10,000 tons of open-hearth steel for first half. A New Jersey sewing machine manufacturer is still negotiating for 18,000 tons of Bessemer and 6,600 tons of open-hearth billets for all of next year, but will take proportions of this tonnage for one, two or three quarters. Prices are very strong at the quoted range below:

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Old Material.—Softness in prices and quiet demand in old material have

not been changed during the past week, though in some quarters a slightly better tone is noted. Some sales of strictly No. 1 heavy melting steel at $15.25 to $15.50, delivered for January-February shipment, are reported. The activity at present of eastern makers in duplexing to increase their output and thereby greatly reducing the quantity of scrap melted, is undoubtedly playing a strong factor in the current sluggishness of this grade. Several thousand tons of rerolling rails have been done at $16.25, delivered. There is considerable inquiry for car wheels for export shipment to Canada for which dealers are offering $14.75 at inland points, which is equivalent to about $15.50, delivered, for eastern Pennsylvania consumption. Several of the car wheel manufacturers are now in the market and find old car wheels are scarce as until recently much of this grade was absorbed by cast iron pipe and steel makers.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.00 to 18.50
Old steel rails (rerolling)	16.25 to 16.75
No. 1 heavy melting steel	15.00 to 15.50
Old car wheels	15.25 to 15.75
Old iron axles	25.00 to 26.00
Old steel axles	20.50 to 21.50
No. 1 railroad wrought	16.25 to 16.75
Wrought pipe	13.00 to 14.00
Cast borings	11.25 to 11.75
Machine shop turnings	11.25 to 11.75
Heavy cast (broken)	15.00 to 15.50
Malleable	13.50 to 14.00
Stove plate	11.50 to 12.00
No. 1 forge	13.50 to 14.00
Low phosphorus	19.50 to 20.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

Old Material.—The feature of this market is still the demand for relaying rails, which is due to the construction work under way in and near this city. Within the week, a single lot of 200 tons of the grade referred to was sold at premium prices, and additional tonnage is pending. Of the melting grades, light cast has been most active in the past fortnight, but without affecting asking prices. The market is quiet, but considered firm, with asking prices for the several grades about as below, per gross ton, f. o. b. cars here, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 R. R. wrought	13.00 to 13.50
No. 2 R. R. wrought	11.50 to 12.00
No. 1 country	10.00 to 10.50
No. 2 country	9.00 to 9.50
No. 1 machinery	11.50 to 12.00
No. 1 steel	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	10.00 to 10.50

BIRMINGHAM

Feeling of Uncertainty Prevails

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Dec. 17.

Pig Iron.—This market has just experienced another quiet week, and in certain sections quotations are no doubt affected. Locally, no sales for delivery prior to the second quarter have been made at lower figures than a schedule of $14.50 per ton at Birmingham, and a basis of $15 per ton at Birmingham is being adhered to strictly for the second quarter. However, it is quite certain that the $14.50 basis can be shaded for local brands in the north and east, and it is understood that a firm offer of $14 for a round tonnage to be delivered promptly would not be refused in some instances, even for shipment into southern territory. There is also more or less disposition on the part of those consumers who bought heavily at the figures prevailing before the last advance, to dispose of their engagements at lower figures than are being quoted at this time. This last has not affected the furnace movement, as the necessary railway equipment to supply the actual melt is being obtained only under the most difficult circumstances. In view of the nearness of the end of the year, an allowance is of course made for the conditions existing, and a decline from the recently adopted status of prices is not expected by the furnace companies. In the meantime, the volume of business being offered for prompt execution is unusually small, while very little interest is being manifested in future deliveries. The actual sales in the past week probably involve less than 3,000 tons, in which one lot of 250 tons was sold for future delivery, and the bulk of the remainder represented requirements that could not be supplied from the tonnage already engaged by reason of local conditions at the furnace plants. As has been shown by furnace returns, the output at all of the active plants is well taken care of for some time after the first of the year, provided, of course, delivery can be made, and the several interests, as a result, are not unusually concerned over the conditions existing; yet there is quite a feeling of uncertainty in local circles, and developments after the first of the year are being awaited with interest. While the market is probably weaker, quotations have not been changed, and the several grades are quoted as below, per gross ton, f. o. b. cars, Birmingham, for delivery prior to the beginning of the second quarter, viz.:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.75 to 14.25
No. 4 foundry	13.50 to 14.00
Gray forge	13.25 to 13.75
Basic	14.00 to 14.50
Charcoal	23.00 to 23.50

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Second quarter deliveries are quoted at prices 50 cents per ton higher than the above, except for charcoal iron.

Cast Iron Pipe. — The volume of business being placed is very small, but when cars are available, shipment against contracts is being made at a very satisfactory rate. The level of prices, except for certain small sizes, is practically the same as has obtained for some months. Water pipe is quoted as follows, per net ton, f. o. b. cars here, viz.: 4-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe. Special fittings are quotable at $45 to $55 per net ton at foundry, depending upon the nature and size of requirements.

HEAVY PRODUCTION

Continues at Plant of Pennsylvania Steel Co.

Steelton, Pa., Dec. 17.—With the tonnage on the books of the Pennsylvania and Maryland Steel companies three and one-half times greater than it was a year ago, the plants here are extremely busy. The past week was another of heavy output and every department is being pushed to meet the demand.

The merchant mill has made an increased production through the new machinery just installed and fewer men are employed to get out the work. Although the Bessemer plant recorded an average output, it was held up to some extent by accidents in the shifting department. The bridge shop is crowded with orders and some heavy work is being constructed. The blast furnaces are in good condition and all are making bonuses.

The new 800-ton steam press was made ready for work and was placed in operation during the week. The building was boarded in and the furnaces fired. The office building is completed.

BUFFALO

Increased Blast Furnace Activity

Office of THE IRON TRADE REVIEW,
Buffalo, Dec. 17.

Pig Iron. — A seasonable holiday quietness is apparent in the local market. The tonnage placed in all grades amounted to 15,000 to 20,000, divided among the stacks of the district. Substantial conditions seem to underlie the business of the district and the general outlook is very good, except for the sentimental effect tariff legislation may have upon the situation.

Rogers, Brown & Co. will put in blast their No. 1 furnace, at the Susquehanna plant, which has been out for relining. It will be blown in the last week of December. This will be the first time since the completion of its stacks 3 and 4, during the present year, doubling the capacity of the former plant, that all four will be in full operation, as No. 2 went out for relining when new No. 3 went in, and No. 1 followed for re-lining when No. 4 was blown in. The books of the plant are virtually filled until July 1 of next year, but the increase in production coming from the operation of all four large stacks, all on foundry grades, has caused a widening of the range of prices, f. o. b. Buffalo, indicated below:

No. 1X foundry	$17.50 to 18.25
No. 2X foundry	17.25 to 18.00
No. 2 plain	17.25 to 17.75
No. 3 foundry	16.75 to 17.50
Gray forge	16.50 to 17.25
Malleable	17.25 to 18.00
Basic	18.00 to 18.25
Charcoal	25.00 to 25.50
*Some grades and brands	22.00

Finished Material. — The principal activity of the week seems to be in specifying on the part of consumers whose contracts are about to expire with the end of the year. From now until Jan. 1, this part of the business is expected to be particularly heavy in practically all lines. In structural, there are a number of inquiries going the rounds of the larger mills from users, who at this time of the year stock orders seeking placement range from double car loads to 200 tons or over. With the larger mills sold up they are finding no takers, except at the convenience of the mills. As that means deliveries into third and possibly fourth quarter, many are being placed with smaller eastern mills, able to make deliveries well within first half, but these mills are getting from 1.60c to 1.75c on the orders accepted by them. Sheet bars are practically booked up solid by the larger interests for all of first half, so that orders placed for "mills' convenience" mean last half deliveries. Prices are firm and business is continuing good in blue and galvanized sheets. Structural material is dependent upon third quarter of next year for deliveries, and in the face of this considerable activity is noted.

Smith & McCaffery, of Syracuse, N. Y., were awarded the contract for the steel in the new factory and warehouse to be erected by the American Can Co., at Rome, N. Y., requiring about 200 tons; the Dominion Theater Co., Hamilton, Ont., is taking bids for a new theater and office building in Hamilton, about 200 tons needed.

Old Material.—A light demand and less activity marked the scrap market during the week. This is attributed to the proximity of the holidays and the approaching inventory period. Prices are not quite as strong on some of the lines, as indicated below. The principal purchases of the week were by out of the district customers. The range, for gross tons, f. o. b. Buffalo, is substantially as follows:

Heavy melting steel	$14.50 to 15.25
No. 1 railroad wrought scrap	15.25 to 15.75
No. 1 R. R. and mch. cast sc'p	13.50 to 14.00
Old steel axles	15.75 to 16.50
Iron axles	23.25 to 23.75
Car wheels	16.00 to 16.75
Railroad malleable scrap	13.25 to 13.75
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	16.75 to 17.25
Old iron rails	15.00 to 15.50
Tank iron	10.25 to 10.75
Boiler plate, sheared	14.50 to 15.00
Pipe and tank	10.00 to 10.50
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.25 to 11.75

ST. LOUIS

Interest Centers in Basic Inquiry

Office of THE IRON TRADE REVIEW,
St. Louis, Dec. 17.

Pig Iron.—Interest still centers on the inquiry for 10,000 tons of northern basic, which made its appearance in the St. Louis territory last week. Half of this tonnage has been placed at Chicago. Other inquiries out are 500 tons of southern No. 2, 500 tons of northern No. 2 and 1,000 tons of 8 per cent northern silicon, together with quite a number of requests for prices on small amounts. One sales agent reports sales last Saturday of 950 tons, made up of small lots to different purchasers. Southern No. 2 is quoted in the St. Louis territory at $14, Birmingham, for shipment over the remainder of the year, and at $14.50 for delivery over the first of next year. Northern iron is held at $18, furnace, Chicago, and $16.50, f. o. b. Ironton, some sales having been made at the last named figure.

Prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Coke.—An inquiry for 1,500 tons of foundry coke is about the most interesting feature in the coke line. Prices are firm and unchanged, but there is very little trading going on.

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery; prompt 48-hour Connellsville furnace, $4.00; contract, $3.25; best 72-hour Virginia foundry, for immediate shipment, $4.25, and for next year, $4.00; 48-hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—With the exception of an active demand for relaying rails, the conditions of the scrap iron market remain unchanged. Dealers are not expecting much improvement until after stock taking, which begins Jan. 1. Prices which dealers are willing to pay, f. o. b. St. Louis, follow:

Gross Tons

Old car wheels	$15.00 to 15.50
Old iron rails	15.00 to 15.50
Rerol'g rails (5 ft. & ov.)	15.00 to 15.50
Old st'l rails (3 ft. & und.)	14.00 to 14.50
Light section relayers (45 lbs. and under) subject to inspec.	24.00 to 25.00
Relay'g rails, subject to inspec.	24.00 to 25.00
Frogs, switches and guards	13.50 to 14.00
Heavy melting steel	13.50 to 14.00
Shoveling steel	11.75 to 12.00

Net Tons

No. 1 railroad wrought	$12.25 to 12.50
No. 2 railroad wrought	12.00 to 12.25
Arch bars and transoms	15.00 to 15.25
Knuckles, couplers, springs	12.00 to 12.50
Shafting	15.00 to 15.50
Steel car axles	16.50 to 17.00
Iron car axles	20.00 to 21.00
Locomotive tires	13.00 to 13.50
Pipe and flues	8.00 to 8.50
Tank iron and cut boilers	8.00 to 8.50
No. 1 cut busheling	11.00 to 11.50
No. 2 cut busheling	9.00 to 9.50
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
R. R. malleable	12.00 to 12.50
Agricultural, malleable	10.50 to 11.00
Stove plates	9.00 to 9.25
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

EIGHT-HOUR DAY

In English Steel Works, Described By John A. Fitch.

During the last seven years there has occurred a considerable shortening of the working day in the iron and steel industry in Great Britain. During that time all the steel works of any importance in South Wales—in the great tin-producing district—and two of the important steel works in the north of England, in the Middlesbrough district, have changed from the twelve-hour to the eight-hour day in their open-hearth departments. Practically all the blast furnaces in the north of England have adopted the eight-hour schedule in that time, the tin mills are all working on the three-shift system, and the most important association of steel manufacturers in the north of England during the last summer reached such a stage in their negotiation with the Steel Smelters' union that they requested the union officials to prepare a plan and submit it to the consideration of the association for introducing the eight-hour day in their plants.

When in England and Wales a few months ago the writer spent some very interesting hours discussing with union representatives and with employers the effects of the shortening of the working day and learning from them the manner in which it was brought about. In the open-hearth furnaces so far as the change has been adopted, it has not cost the manufacturers one cent in extra labor cost. In fact, the original proposal made by the Steel Smelters' union was that they would agree, if the employer would introduce three shifts instead of two, to work for the same rate per ton as that which they had been receiving before. As may readily be imagined, such a reduction in daily earnings was more than the lower paid men could stand. But in order to get the plan into operation, the highly skilled men who were receiving the better wages agreed that a certain percentage of their earnings should be diverted to the men who were not so well paid, in order to make it possible for them all to work eight hours instead of twelve. Since the adoption of the plan, however, the tonnage of the various plants has so increased that the highly skilled men, in spite of their original reduction of 33 1/3 per cent and then their additional voluntary reduction in order to help their fellows, are today earning more money in eight hours than they were getting before when they worked twelve.

Not quite the same arrangement was made in the blast furnaces. There, in most cases, it was felt that a certain increase would have to be made in order to enable the men to have a living wage after having reduced their time one-third. But there, too, experience has proven that the plan is a success. Output has increased and labor cost has not materially risen. We were told by a representative of the Bolckow, Vaughan Co., one of the largest companies in the United Kingdom, that undoubtedly labor cost had increased somewhat, but it is now practically impossible to say how much that increase may be. In spite of that, however, the Bolckow-Vaughan Co. would not go back to the twelve-hour day and the twenty-four-hour shift in their blast furnaces under any circumstances. They believe, they assured us, that a twelve-hour day in blast furnaces is altogether too long and they would prefer to have a somewhat higher cost and a more satisfactory working day.

Semi-Monthly Pay Days Established

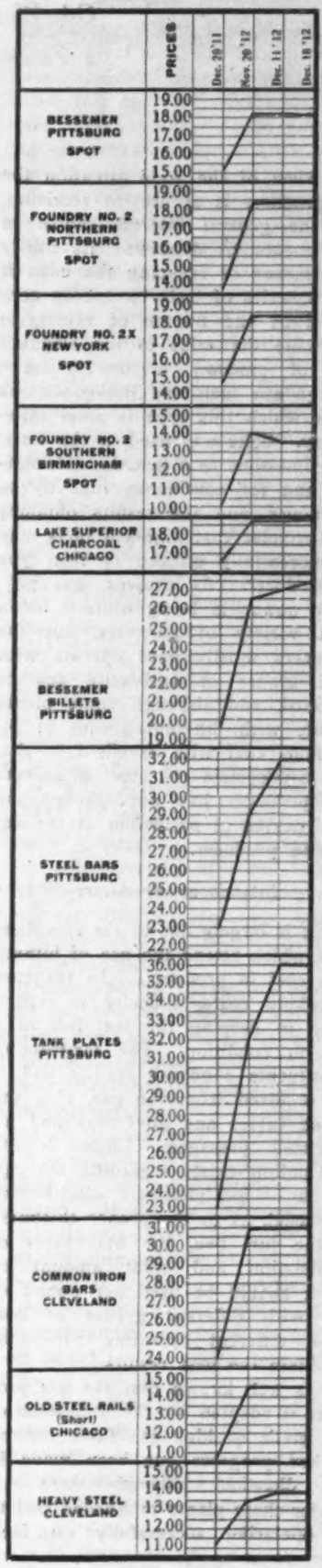
Orders have been issued from the general offices of the Carnegie Steel Co., Pittsburgh, fixing the tenth and twenty-fifth days of the month as the regular pay days for the company's employes. This order has been in force for some time at the Braddock and Homestead works and now becomes operative at the Youngstown, O., plants. It is stated that this rule will go into effect at the beginning of next year, thus establishing uniform pay days throughout the whole Carnegie Steel Co. system and doing away with the three weeks' pay days.

Employes Share Stock Dividend

Notice has been given to the shareholders of the Baker Motor Vehicle Co., Cleveland, of a stock dividend of $200,000, of which half will go to the shareholders and half to employes. This is said to be the first case on record where shareholders and employes have been treated with absolute equality in the distribution of a stock dividend. At last reports, the company had an authorized capitalization of $1,000,000, of which $500,000 was outstanding.

The plant of the American Brass & Copper Co., New York City, was damaged to the estimated amount of $10,000, by fire, Dec. 13.

PRICE CHART



Experiments Made With a Slagging Gas Producer[1]

Coke Was Used in this Series of Tests With Limestone as a Flux—Believed That High-Ash Coals May Be Used

By Carl D Smith

In view of the wide attention the gas producer is at present receiving, and the general interest shown in experiments to determine its utility as a means of reducing the cost of fuel, a series of tests have been conducted by the Bureau of Mines, to determine the value of the slagging type of producer in the utilization of high ash fuels and the conditions under which this type is most satisfactory. Coke was used in the tests, with limestone as a flux, for intermittent and for continuous runs up to 100 hours, and the results obtained give promise that high-ash fuels may be successfully utilized in this type of producer. At present, gas producer power is being utilized for a great variety of purposes, but the producers mostly used operate with good grades of anthracite pea or nut coal, and although some plants operate with different grades of bituminous coal with excellent results, the development of the bituminous coal producer has not reached the same degree of perfection as the anthracite producer.

Bituminous Producers

This is largely due to the complications which attend the use of bituminous coal in producers. In the case of coking coals, difficulty is experienced in keeping the fuel bed in a uniform condition. The tar-forming constituents condense readily and if not removed from the gas, clog the engine valves and governors and all restricted passages. Little definite information exists regarding the operation of gas producers with bituminous coal, as to the proper thickness of the fuel bed, the best rates of combustion and what amount of steam should be used per pound of fuel with different grades of coal under different operating conditions to obtain the best results.

It is well known that the gas producer is adapted for the utilization of low grade or high ash fuels, but no marked progress has been made in this direction, although there are two or three plants in Europe said to be operating successfully on fuels containing as high as 50 to 60 per cent of ash, but in the United States, so far as is known, there is no plant operating regularly on coal of very high ash content. Several tests were made by the Bureau of Mines on fuels containing from 34 to 44 per cent of ash. The results, however, were not considered practical from a commercial standpoint, as they were made with a producer adapted only for the best grades of fuel. However, these were taken as indicating clearly the possibilities that may be realized with these fuels.

Laboratory Experiments

The principal combustible in producer gas is carbon monoxide, which is a colorless, odorless gas, the product of incomplete combustion in which the carbon combines with one-half the oxygen required for complete combustion. The formation of this gas takes place when air passes through a thick fuel bed of incandescent coke or carbon. Laboratory experiments show that for the production of high percentages of carbon monoxide, the fuel bed should have a temperature of 2,300 degrees Fahr. or over, as at this temperature the capacity of the producer is greatly increased. In usual practice, however, such high temperatures are avoided carefully, otherwise the ash fuses and entails serious clinker difficulties. High temperatures, while very desirable, cannot be maintained without serious disadvantages, and as a result of these conflicting conditions, the operation of producer plants is a compromise in which the temperatures maintained are as high as the ash permits without fusion and the formation of objectionable clinkers.

It was to avoid these difficulties that the tests were conducted with a slagging or blast furnace type of producer, in which the ash is removed as a liquid slag. These producers were among the first producers made, but for some reason have been little used. Bischof is usually credited with having built the first internally-fired gas producer in 1839, and only a year later, in 1840, Ebelmen built the first slagging producer at the works of Audincourt in France. In 1881, a slagging producer was built in Chester, N. J., by W. J. Taylor, from which very satisfactory results were reported from a four weeks' continuous operation, but of its subsequent operations no information was ever obtained. This type of producer seems to have dropped out of use, in this country, although in France a battery of slagging producers was installed at the glass works at Gironcourt-on-Vosges in 1907, which furnishes gas for several large plate and annealing ovens and is reported to be working in a satisfactory manner.

The producer used in the tests conducted by the Bureau of Mines, consisted of a steel shell lined with fire brick and provided with a slag notch. Near the base were six air tuyeres, and in addition to these, four separate tuyeres were provided at points above the air tuyeres, through which steam could be admitted. Fuel was charged at the top of the producer, and the gas passed off through the side at the point near the top. Because of the extremely high temperatures that prevailed in the combustion zone, a water-cooling arrangement, consisting of a coiled pipe, was embedded in the brick lining. The coil extended over a space of 20 inches just over the air tuyeres, and between the coal and the fire was a 4½-inch layer of magnesite brick.

Steam and Air Tuyeres

The steam and air tuyeres were of cast iron, and extended through the brick lining to the fire. They were water-cooled to protect them from the intense heat. The top of the producer was also water-cooled.

The scrubber consisted of a cylindrical shell with water sprays, but no baffle plates or layers of coke. The gas entered at the bottom through a water seal, passed upward through a dense spray or fog, and finally through a layer of excelsior, which acted as a dry scrubber. From the scrubber the gas passed directly to a meter. The air blast was furnished by a blower of the positive pressure type, the amount being

[1]From a bulletin issued by the Bureau of Mines of the Department of the Interior.

varied with the fuel consumption. The air blast pressure in the tuyeres varied from 5 to 6 inches of water to 16 inches at the higher rates of fuel consumption. Steam was supplied at definite rates from a small, gas-fired boiler. The air blast was preheated in a small heater using the producer gas as fuel.

Limestone as a Flux

Coke containing 11 per cent of ash was used in the preliminary tests, and the limestone was crushed to ½ inch size in order to obtain a very liquid slag. The amount of limestone required to produce a fusible slag was calculated from the analyses, but the results were unsatisfactory, and the problem became one of trial rather than of calculation, and tests were made with different amounts of limestone varying from 4 to 28 pounds per 100 pounds of coke charged.

In the first trial 30 pounds of coke were burned per square foot of fuel bed area per hour, and to each 100 pounds of coke charged, 6 pounds of limestone were added; the fuel bed was maintained at a depth of 6 feet; no steam was used, neither was the air preheated, and the result was that the ash and limestone fused into a pasty mass at the bottom of the producer and when the slag notch was opened the semi-fluid slag flowed out very slowly; it was exceedingly sticky, solidified quickly and presented a black, glassy appearance when cold.

These characteristics were maintained throughout the trial, but the slag did not apparently accumulate or solidify in the producer. The gas, when analyzed, showed 31 per cent carbon monoxide and less than 2 per cent carbon dioxide. Theoretically, the amount of limestone would be only 4 pounds per 100 pounds of coke, but tests showed this amount to be insufficient.

Trial Runs

Trial runs were made using 12, 20, and 28 pounds of limestone under the same conditions as with the 6 pounds. Fair results were obtained with 12 pounds; the slag was a little sticky, but fluid, and there were no evidences of clinkering. With 28 pounds, the maximum that would make a fluid slag was undoubtedly passed, the slag possessed little fluidity and solidified completely after leaving the producer. With 20 pounds limestone per 100 pounds of coke, satisfactory results were obtained, the slag ran from the producer very freely and was very fluid.

With intermittent operation, considerable difficulty was experienced from clinker accumulations when cold air was used, but the use of hot blast solved this difficulty, although a producer of this type is not adapted for intermittent operation. With continuous runs very satisfactory results were obtained, both as to the character of the slag and the quality of the gas. The gas averaged about 31 per cent carbon monoxide, and less than 1½ per cent carbon dioxide. The slag was tapped regularly once an hour; about 20 pounds of coke was consumed per square foot of fuel bed area per hour and to each 100 pounds of coke, 15 pounds of limestone were charged. The air was preheated to 440 degrees Fahr., and no steam was used. At the end of the test a layer of hard, flint-like clinker, 4 to 6 inches thick, lay in the bottom of the producer. Other runs of 100 hours' duration were made, with and without preheated air blast and with and without steam, and in each case little difficulty was experienced in tapping the slag. With hot blast a more fluid slag is obtained and higher rates of combustion can be maintained.

The use of steam appears to have no appreciable effect upon the slagging of the ash, and in several tests 0.75 pound of steam per pound of fuel consumed has been used. That the steam produces no cooling effect upon the slag is undoubtedly due to its delivery through separate tuyeres at points considerably above the air tuyeres. The readiness with which the ash has been made to slag in the producer is very encouraging and strengthens the belief that high-ash coals may be successfully utilized in producers of this type.

TRAINMEN QUIT

At Cambria Plant.—Late News of the Pittsburgh District.

Pittsburgh, Dec. 18. (By wire.)—Shortly following the settlement of the strike of about 500 trainmen employed by the Carnegie Steel Co., 100 engineers and brakemen at the plant of the Cambria Steel Co., Johnstown, walked out late yesterday afternoon. Although the men are asking higher wages, no form of petition has been presented to company officials. It is advised that the walk-out has not crippled the plant. The trainmen employed by the Carnegie company returned to work for identically the same wage received before the strike.

LARGE INCREASE

In Capacity of Fiborn Limestone Quarry in Michigan.

Marquette, Mich., Dec. 17.—The Algomah Steel Co., the largest of the Lake Superior Corporation's subsidiaries and operator of the iron and steel-making plants at the Canadian Soo, is preparing for a busy season at its limestone quarry at Fiborn, its only possession on the Michigan side of the international border. New machinery and equipment have doubled the capacity of the quarry, practically the entire product of which is used as a furnace flux, some of it being sold to other interests. A considerable quantity is shipped to the Dollar Bay, Mich., copper smelter. The Zenith furnace at Duluth is also a large consumer. Last year's shipments averaged 50 cars a day.

The Fiborn quarry was formerly owned by William J. Fitch, of this city, until a year ago president of the Duluth, South Shore & Atlantic railroad, and Governor Chase S. Osborn. They sold their holdings to the Algomah company two years ago. The name Fiborn is derived from a combination of the first two letters of Mr. Fitch's name and a portion of Mr. Osborn's name. The quarry is the only one of its kind in northern Michigan, there being little limestone of commercial value north of the Straits of Mackinac. The average yearly production of limestone in Michigan is valued at about $600,000, and about two-thirds of the product is used for chemical processes, such as the production of alkaline salts and in sugar refining.

About one-sixth of the production is used for railroad ballasting and nearly $90,000 worth of limestone is used annually as a furnace flux. The price ranges from 50 to 60 cents a ton. There is a growing demand for Fiborn limestone. The new steel plant at Duluth is expected to be a large consumer, and it was partly the assurance of this business that led the operators to increase the capacity of the quarry. The company originally purchased the Fiborn quarry to produce flux limestone exclusively for its own production, but the commercial production of flux has been found to be a highly remunerative industry.

Fiborn is 118 miles east of Marquette, and 37 miles west of the Soo. The quarry is a large open pit several thousand feet in diameter and more than 50 feet deep, and is in the side of a steep bluff of limestone, one of the only outcroppings of this rock north of St. Ignace.

FROM HUMBLE START

Geo. Burnham Became Head of Baldwin Works—Began With Baldwin.

The story of the life of George Burnham, for 36 years head of the Baldwin Locomotive Works, who died at Philadelphia recently, embraces the rise from a humble beginning to a high position of prominence in industrial and financial circles. For 73 years Mr. Burnham had been associated with the Baldwin plant, starting as an accountant and as associate of Matthias W. Baldwin, when the latter first demonstrated the success of his "Old Ironsides" locomotive and began the manufacture of locomotives in 1836. The youthful Burnham, then a clerk at Philadelphia, was induced to join his partners with the new enterprise and gave his attention to the accounting end. In 1867, Mr. Burnham was admitted to the firm which was known as M. Baird & Co. In 1873, he was the senior partner of Burnham, Parry, Williams & Co. and until 1909, upon the incorporation of the Baldwin Locomotive Works, when he retired, he remained the head of the industry. At his death, Mr. Burnham was 95 years of age. Among his children is Wm. Burnham of Philadelphia, president of the Standard Steel Works Co., at Burnham, Pa.

Test Largest Cable

What is reported to be the largest hoisting cable ever manufactured was recently tested at the Fritz Engineering Laboratory of Lehigh university, at South Bethlehem, Pa., and required a load of 728,000 pounds before breaking. The test was conducted before representatives of the John H. Roebling & Sons Co., Trenton, N. J., which is manufacturing the cable for the Spanish-American Iron Co. for use in its Mayari iron ore mines in Cuba, where it will be employed to haul 100,000-pound steel cars up an incline 6,800 feet in length. The cable consists of six strands each of 19 single wires twisted about an independent wire rope center. This center rope in turn has six strands of 19 wires each twisted around a hemp core. The finished cable is 7,810 feet long and weighs 123,360 pounds.

The foundry of the Bateman Mfg. Co., Grenloch, N. J., was seriously damaged by fire Dec. 14, the loss being approximately $10,000. A force of men was put at work to clear away the debris while the embers were still hot, and it is expected that the rebuilding will have been completed and work resumed in this department within two weeks.

EARNINGS INCREASE

Report of American Brake Shoe & Foundry Shows Gain.

Net earnings of the American Brake Shoe & Foundry Co. for the year ended Sept. 30, last, reached $1,014,448, compared with $989,267 in 1911 or an increase of $25,181. A comparative statement of the income account for the past two years, is as follows:

	1912.	1911.
*Earnings	$1,052,718	$1,028,808
Interest	38,271	89,542
Surplus	$1,014,448	$989,267
Dividends	532,000	532,000
Surplus	$482,448	$457,267

*After deducting manufacturing, administrative and selling expenses and depreciation, and including other income and earnings of subsidiary companies.

The stockholders approved the recommendations of the directors that the preferred dividend be increased to an 8 per cent basis by the payment of a quarterly dividend of 2 per cent next April.

Piling of Maine Cofferdam Sold As Scrap

The approximately 5,000 tons of sheet piling used by the United States government for the construction of the cofferdam in Havana harbor for the raising of the battleship Maine has been purchased as scrap by the Alan Wood Iron & Steel Co. The final shipment of this material has just been made to the steel plant of the purchaser at Ivy Rock, Pa. The Lackawanna Steel Co., which originally furnished the piling to the government for the work, received the material back after the successful termination of the engineering feat of raising the ill-fated battleship and then offered the tonnage in the open market as scrap.

Discuss Tariff Reduction.—The reduction of the duty on agricultural implements from the United States is under discussion in the Saskatchewan, Can., legislature.

A number of core makers employed by the National Malleable Castings Co. in its Toledo, O., plant, recently walked out because, as they said, of the introduction of women and girls into the core room.

CHICAGO SELECTED

For Meeting of Foundry Organizations Next September.

Chicago, Dec. 16.—At a recent meeting of representatives of the Foundry & Machine Exhibition Co., the American Foundrymen's Association and the American Institute of Metals, Chicago was selected as the place for the 1913 convention of the allied foundry organizations. The convention will be held during the week of Sept. 29, which is just before the fall rush of business and is at the time when the weather is most delightful. No place for the meetings in the city have yet been definitely selected, although the meetings of the American Foundrymen's Association and the American Institute of Metals will probably be held at some of the large down-town hotels, while the exhibition will be housed in one of Chicago's large pavilions.

It has been 12 years since a foundry convention has been held in the west, Chicago being selected in 1901. It is interesting to note that at the first Chicago convention, Dr. Richard Moldenke was elected to his first term as secretary of the American Foundrymen's Association, a position which he has filled continuously ever since. Western foundrymen are enthusiastic over the selection of the big metropolis as the scene of the next convention, and will make great preparations to insure an occasion which will be long remembered.

Death of Cyrus Elder

Cyrus Elder, prominent as a lawyer, editor and as a business organizer in the steel and other industries, died suddenly at Philadelphia, Dec. 14, at the age of 79 years. He was found dead in bed in his apartments. Mr. Elder, after serving in the Civil war, settled in Johnstown, Pa., to practice law in 1863. A short time later, he became solicitor and general agent for the Cambria Iron Co. and later continued with the Cambria Steel Co. in that capacity until 1901.

Draftsmen Wanted.—There is an active demand for draftsmen, especially for rolling mill work, and the Carnegie Steel Co. is among the companies that are looking for men. The Carnegie company wishes to add to its force of draftsmen at the Duquesne plant.

LARGE INCREASE MADE

Of Ore on Docks and Receipts at Lake Erie Ports.

Figures compiled by *The Marine Review* from the returns sent in by the various dock companies show that iron ore receipts at Lake Erie ports during the season of 1912 were 38,624,108 tons, out of a total movement of ore by lake of 47,435,777 tons. Lake Erie docks on Dec. 1 held a balance of 9,494,625 tons, which is the largest store on hand in the history of the traffic, the largest previous amount having been 9,426,881 tons, held on Dec. 1, 1910.

During 1911 the total shipment by lake was 32,130,411, of which Lake Erie docks received 25,531,550 tons and held a balance on Dec. 1, 1911, of 9,131,664 tons. During 1910 the total shipment by lake was 42,620,201 tons, of which Lake Erie docks received 34,042,897 tons and held a balance on Dec. 1, 1910, of 9,426,881 tons. During 1909 the total shipment by lake was 41,683,873 tons, of which Laek Erie docks received 33,672,825 tons and held a balance on Dec. 1, 1909, of 8,965,789 tons. During 1908 the total shipment by lake was 25,427,094 tons, of which Lake Erie docks received 20,414,491 tons, and held a balance on Dec. 1, 1908, of 8,441,533 tons. The reserve of 9,494,625 tons is more than will be needed for winter consumption. Never in the history of the trade have 5,000,000 tons gone forward from dock to furnace during the winter season.

Shipments to furnace between May 1 and Dec. 1, 1912, aggregate 35,010,728 tons, compared with 23,178,370 tons in 1911, compared with 30,060,096 tons in 1910, 30,077,304 tons in 1909, 17,453,258 tons in 1908, 29,737,018 tons in 1907, 27,615,392 tons in 1906, 24,311,720 tons in 1905, 16,658,806 tons in 1904, 16,903,013 tons in 1903, and 18,423,364 tons in 1902.

The shipments to furnaces during the season of navigation, as referred to, are determined in this way: First, we have the amount of ore on Lake Erie docks as of May 1, last, 5,881,245 tons; add to this the receipts of the season just closed, 38,624,108 tons, and the total is 44,505,353 tons; deduct the amount on dock Dec. 1, 9,494,625 tons, and we have 35,010,728 tons as the amount that was forwarded either direct or from dock to furnace yards.

It is understood, of course, that the difference between the total output of 47,435,777 which was shipped from the Lake Superior mines during 1912, and the receipts of 38,624,108 tons at Lake Erie ports, is ore that went to places other than Lake Erie ports, such as the furnaces at Lake Michigan ports. The amount of ore on dock May 1, 1912, as given above does not include April receipts, which amounted to 30,399 tons. The accompanying table shows receipts at Lake Erie ports and amounts on dock during six years past.

IRON ORE RECEIPTS AT LAKE ERIE PORTS, GROSS TONS.

	1912.	1911.	1910.	1909.	1908.	1907.
Toledo	2,563,278	493,345	1,225,202	1,374 224	680,553	1,314,140
Huron	540,586	223,947	197,951	243,082	213,377	971,430
Sandusky	.....	.....	.....	11,088	.....	83,043
Lorain	3 771,350	2,937,605	2,884,738	2,796,856	2.286,388	2,621,025
Cleveland	7,914,836	4,584,211	6,344,943	6,051,342	4,240 815	6,495,998
Fairport	1,810,381	666,365	1,516,434	1 734,277	1,518 961	2,437,649
Ashtabula	8,158,080	6,359,131	9,620,638	8,056,941	3,012 064	7,521,859
Conneaut	7.839,831	6,931,278	6,309,548	7,007.834	4,798,631	5,875,937
Erie	547.067	289,400	942,592	1,235,057	828,602	2,294,239
Buffalo	5,060 642	2,802,976	4,704,439	5,002,235	2,835,099	5,580,438
Detroit	418,057	243,292	296,412	159,889	.....	.....
Total	38,624,108	25,531,550	34 042,897	33,672,825	20,414,491	35,195,758

IRON ORE ON LAKE ERIE DOCKS, DEC. 1, GROSS TONS.

	1912.	1911.	1910.	1909.	1908.	1907.
Toledo	549,473	661,382	433,215	332,456	590,925	518,645
Sandusky	2,472	2,471	17,728	39 557	36,079	44,546
Huron	385,810	344,371	375,118	477.333	458,158	415,730
Lorain	320 713	314,321	259,448	407,129	426,274	366,271
Cleveland	1,888,560	1,589,491	1,638,795	1,547,142	1,458,392	1,281,335
Fairport	565,920	636,566	839,970	867,640	835,821	523,981
Ashtabula	3,350,553	3,295 862	3,287,816	2,594,359	2,293 531	2,056,823
Conneaut	1,429,533	1,237,573	1,329,997	1,411,002	1.296,675	1,000,774
Erie	661,330	636,274	792 011	788,046	730,530	652.219
Buffalo	340,261	413,353	452,783	501.125	315,148	435,407
Total	9,494,625	9,131,664	9,426,881	8,965,789	8,441.533	7,385,728

Industrial Commission Named

President Taft has named the following men as members of the industrial commission, created by congress, to investigate working conditions and attempt to make more amicable the relations between capital and labor:

United States Senator George Sutherland, of Utah; George B. Chandler, member of the Connecticut legislature; Charles S. Barrett, of Georgia, president of the farmers' union; F. A. Delano, of Illinois, president of the Wabash railroad; Adolph Lewisohn, merchant and philanthropist, of New York; F. C. Schwedtman, electrical engineer, of Missouri; A. B. Garrettson, of Iowa, president of the Railway Conductors' Association; John B. Lennon, of Illinois, treasurer of the American Federation of Labor; James O'Connell, of the District of Columbia, vice president of the American Federation of Labor.

In conformity with the act of congress there are three employers of labor, three labor organization men and three other persons on the list.

PREVENTION OF STRIKES

Discussed by Cleveland Branch of Metal Trades Association.

At its annual fall meeting at the Hotel Statler, Tuesday evening, the Cleveland branch of the National Metal Trades Association entertained the national president of the association, Henry D. Sharpe, of the Brown & Sharpe Mfg. Co., Providence, R. I. A delightful banquet was served, followed by a number of interesting talks. The ruling sentiments as expressed during the evening strongly emphasized the desire for better relations between employer and employe. Mr. Sharpe reviewed briefly the history of the association since its organization and spoke especially of the declaration of principles in 1900. He said that the aim of the association is to promote the welfare of both employer and employe, to prevent strikes, rather than to fight them.

"The National Metal Trades Association," said Mr. Sharpe, "is not a solution of the industrial problem; in fact there is no panacea, but it is indeed a very helpful step."

He enumerated several ways in which employers could aid in the prevention of strikes, such as in the careful selection of foremen, and in the personal supervision of affairs.

W. D. Sayle, of the Cleveland Punch & Shear Works Co., a former president of the Cleveland branch, gave a short talk on "Continuation Schools", urging the support of Cleveland manufacturers in this line of endeavor. H. H. Johnson, president of the Cleveland chamber of commerce, Judge F. A. Henry and Rev. F. W. Luce also spoke briefly. Charles D. Wilson, president of the local branch, and general manager of the Ferro Machine & Foundry Co., Cleveland, acted as toastmaster.

The Wilcomb Machine Co. has sold its mill at Norristown, Pa., to J. Frank Boyer, for $28,500.

CORPORATION HEARINGS

Will be Resumed in New York Next Month—Gray on Stand.

Philadelphia, Dec. 18. (By wire.)—It was decided last night to adjourn hearings in the United States Steel Corporation dissolution suit until January, when they will be resumed in New York.

William G. Gray, statistician of the American Iron and Steel Association, was a witness when the Steel Corporation hearings were resumed here yesterday. He was questioned by Mr. Colton, of government counsel, regarding the sources of the information on which data in the association's directory and its other publications, are based. The hearing was held in the association's offices.

Mr. Gray was requested to prepare tables showing pig iron production by grades of Corporation stocks from 1901 to 1910, also showing production of rolled iron and steel by the Corporation and independent companies.

SWANK'S STAFF

Will Be Taken Over by American Iron and Steel Institute.

New York, Dec. 18. (By wire.)—It is announced that after the retirement of James M. Swank as manager of the American Iron and Steel Association Jan. 1, the statistical bureau now at Philadelphia will be continued there for the present by the American Iron and Steel Institute, which will carry on the work in the future. Wm. G. Gray, statistician of the association, and the present staff which has assisted Mr. Swank in the work, will be retained. An official announcement covering more completely the change in the direction of the work will be issued shortly from offices of the association.

Biscuit Company Orders Steel

New York, Dec. 18. (By wire.) — The National Biscuit Co. has placed an order with the Carnegie Steel Co. for 4,000 tons of plain material for a new building to be erected in New York. The fabrication will be let out to local shops.

William H. Lewis, general superintendent of the Aliquippa works of the Jones & Laughlin Steel Co., has resigned and will enter business for himself Jan. 1. He will be succeeded by F. D. Hufnagel, general superintendent of the South Side works of the Jones & Laughlin Co. Mr. Lewis is one of the best known mill superintendents in the Pittsburgh district. Before becoming identified with the Jones & Laughlin Co. five or six years ago, he was with the Carnegie Steel Co. Mr. Hufnagel's successor has not been named.

AT LOW RATE

Corrigan, McKinney & Co. Will Haul Ore, While Others Get More.

It is as good as settled that the freight rate during 1913 will be 45 cents from the head of the lakes, an advance of 5 cents over the carrying charges for 1912. Corrigan, McKinney & Co., who made the original charters at 40 cents last year, offered considerable business to the vessel men at that figure on Tuesday, but the vessel owners would not take it, though the firm tied up its own vessels on that basis. Other shippers have entered the market and a considerable block of ore has been covered at 45 cents. Vessel owners in general were hoping that the advance would be 10 cents. Leading shippers are quite willing to pay 5 cents and it would not be surprising if chartering on this basis would become very active this week.

THIRTEEN THOUSAND

Represents Week's Car Orders—Many More Pending.

New York, Dec. 18. (By wire.)—Car orders placed during the week aggregate 13,000, according to builders and well informed circles. New York Central is understood to have placed some additional lots and is still in the market for a round number. The Baltimore & Ohio has placed an additional 1,000 hoppers and the Norfolk & Western has given the Ralston Steel Car Co. 1,000 hoppers. The latter road is inquiring for 2,000 additional. The Steel Corporation continues to negotiate for 3,000 cars.

Chicago mills have taken an order for 35,000 tons of car material for a builder in that district.

The La Belle Iron Works, Steubenville, O., will open a branch sales office on the twenty-third floor of the Oliver building, Pittsburgh, Jan. 1. It is not known definitely who will be the permanent representative of the company at that city.

EXPORT BUSINESS

Is a Factor in Rail Orders and Inquiries.

New York, Dec. 18. (By wire.)—The Harriman Lines have formally closed for about 200,000 tons of rails for next year's delivery, of which about 135,000 goes to Steel Corporation mills. The Pennsylvania Steel Co. receives 10,000 and bulk of the remainder goes to the Colorado Fuel & Iron Co. Part of Brazil's order for 4,000 tons of rails has come to American mills.

The large order for Argentine is still pending and Chili is out for 7,000 tons. An interesting export order, taken by the Exports company, calls for 3,000 tons girder rails for Belgium, clearly showing the inability of mills there to make desired delivery. The Southwestern order has been increased with the Pennsylvania Steel Co. from 6,000 to 9,800 tons.

METAL MARKETS

Chicago

Dec. 16.

New Metals.—The market continues quiet, although somewhat steadier than a week ago. Copper is stronger, having advanced ⅛ cent during the week.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17½c; casting, 17⅜c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.25c; lead, desilverized, 4.25c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 49.57c; Cookson's antimony, 10⅝c; other grades, 9¼c.

Old Metals.—Seasonal dullness is apparent in the old metals market, there being very little activity, and dealers' selling prices being practically unchanged.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible sheets, 17c; copper bottoms, 14½c; heavy red brass, 13¼c; heavy yellow brass, 10¼c; No. 1 red brass borings, 12½c; No. 1 yellow brass borings, 9.25c; brass clippings, 10½c; lead pipe, 4½c; zinc scrap, 5½c; tea lead, 4c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 47c; tin foil, 40c; linotype dross, 3½c; stereotype plates, 4c; stereotype dross, 3.50c; prime slab zinc dross, $131 a ton.

Electric Drive at a Canadian Nickel Mine

Description of the Electrically-Driven Power Plant, With Details of Motor Starters and Control Apparatus

In the mining districts of northern Ontario, Canada, conditions have been favorable to the introduction of electricity for the operation of mining machinery. Fuel is very expensive and many of the mines are located at great distances from the trunk lines of the railroads, so that the transportation of fuel becomes a serious problem. On the other hand, the country has many waterfalls which can be used for the generation of electrical energy with a small amount of investment for improvements. As a result, all the larger properties in the Ontario district operate their hoists, pumps, blowers, etc., by electrical energy, which sometimes is transmitted over long distances.

The Mond Nickel Company

One example of such an installation is at the mine of the Mond Nickel Co., at Mond Nickel, on the Canadian Pacific railroad. This company produces a rich nickel ore from a mine approximately 1,000 feet deep. The ore is reduced in the company's smelter at Mond Nickel. The company has its own power station from which power is supplied over a high tension line to the mine sub-station and to the sub-station at the smelter. The sub-station at the mine is shown in Fig. 2. It is located approximately four miles from the smelter and railroad station. The mine hoist is partly shown in Figs. 1 and 3. It is of the double-drum type and is driven by 300-horsepower 550-volt Allis-Chalmers-Bullock slip ring motor. The motor is controlled by a series, relay type reversible controller installed at the right of the hoist motor, and which, in turn, is controlled by a master drum, shown in Fig. 3.

The Controller

The Cutler-Hammer series relay controller consists of two double-pole, alternating current contactor switches with blowouts for the control and reversal of the primary circuit and a number of double pole switches of the same design for the control or resistance in the secondary circuit of the motor. These secondary switches, in turn, are controlled by 3-phase series relays connected into the secondary circuit in such a way that they prevent closure of the different accelerating switches until the motor has attained a certain speed and the accelerating current has dropped to a predetermined value, which can be varied by varying the adjustment of the series relays.

The master drum is of the multi-step type and is an ordinary cylinder drum controller by means of which the operator is enabled to start and reverse the motor and run it at any speed desired. Should he throw the master drum quickly to the full speed position, the motor resistance would not be cut out suddenly, which would result in a heavy overload on the line, but the acceleration is under the control of the series relays described, and the motor will attain the speed gradually, without line troubles and without injury to the motor winding. The hoist is stopped by hand-operated brakes and is further equipped with an emergency brake, which is set by a falling weight, held suspended by a latch. Upon failure of the line current, this latch is tripped by an alternating current solenoid and after the current is re-established the brake is reset by hand.

Transformers in Sub-Station

In the sub-station there are three transformers which step down the high tension to 550 volts, at which voltage all motors are operated. The sub-station also contains one 300-horsepower, 550-volt, motor-driven turbine pump for draining the mine; two 75-horsepower blowers and one 300-horsepower air compressor. The motors are controlled by drum type potential starters, shown in Fig. 4. These potential starters are mounted in front of the switchboard, which contains the necessary indicating instruments and the oil switches for the individual motors. The drums are of the cylinder type and all contacts are oil-immersed. The leads are brought out through the cover of the controller and are sealed with an oil-proof cement, which prevents creep-

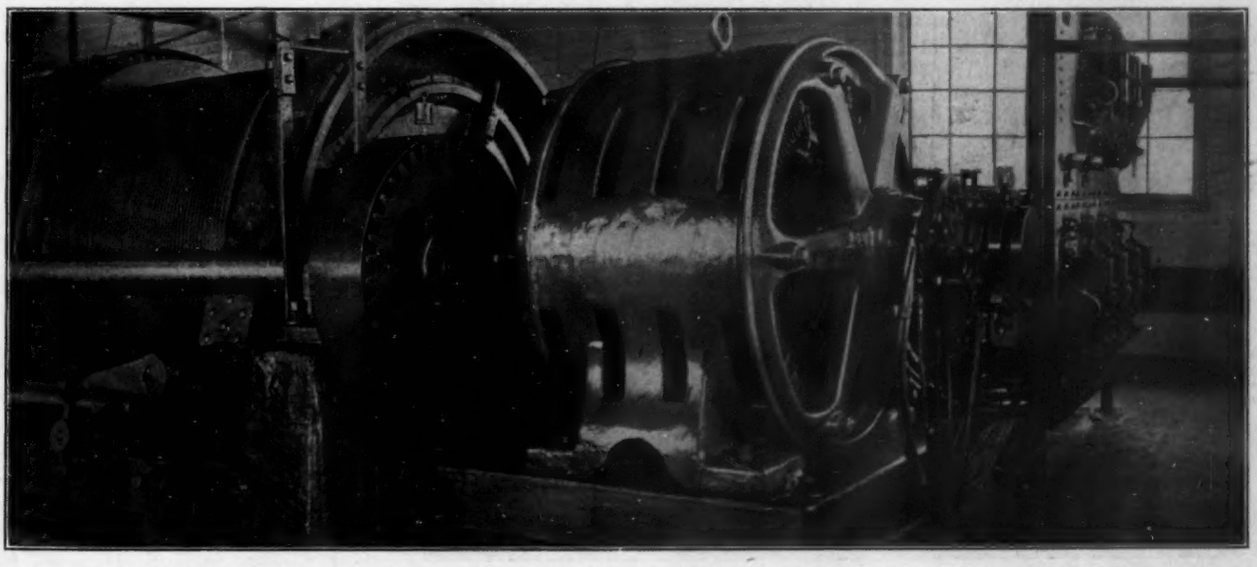


FIG. 1—RIGHT HAND DRUM OF THE DOUBLE-DRUM, MOTOR-DRIVEN MINE HOIST, WITH THE MOTOR CONTROL PANEL AT THE RIGHT

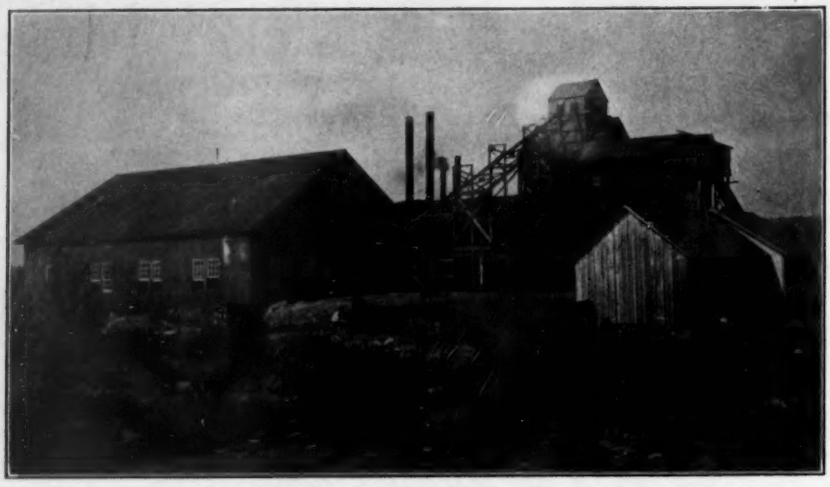


FIG. 2—EXTERIOR OF THE SUB-STATION

age of oil along the leads. The top forms the support for all contact parts and for the oil case, which consists of a seamless tank. This tank may be lowered below the floor line so that all contact parts are readily accessible for inspection. The top cover rests on a cast iron ring which is supported from the floor by three gas pipes. This type of vertical drum for large size potential starters is satisfactory for the reason that it can be mounted in front of the switchboard in such a manner that the drums are directly opposite the indicating instruments on the switchboard, and while starting the motors the operator has a close check of the starting current, voltage, etc.

The ore is transported from the mine to the smelter, which is a distance of approximately four miles, by a cableway, driven by a 30-horsepower motor. The cableway traverses rough country and the cost of building a railroad to the mine would have been excessive. At the smelter there is a second sub-station with the necessary step-down transformers and a number of blowers and compressors for the operation of the converters. Besides these, a motor generator set supplies direct current for the motors operating the converters, cranes and similar machinery. The electrical installation has been in service more than two years and no interruptions have been experienced since the installation with the exception of one or two minor troubles caused by lightning discharges. As a whole, the country is fairly free from lightning disturbances, and discharges on the line usually take place without even opening the circuit breakers. The motor starters and control apparatus for operating the motors were furnished by the Cutler-Hammer Mfg. Co., Milwaukee.

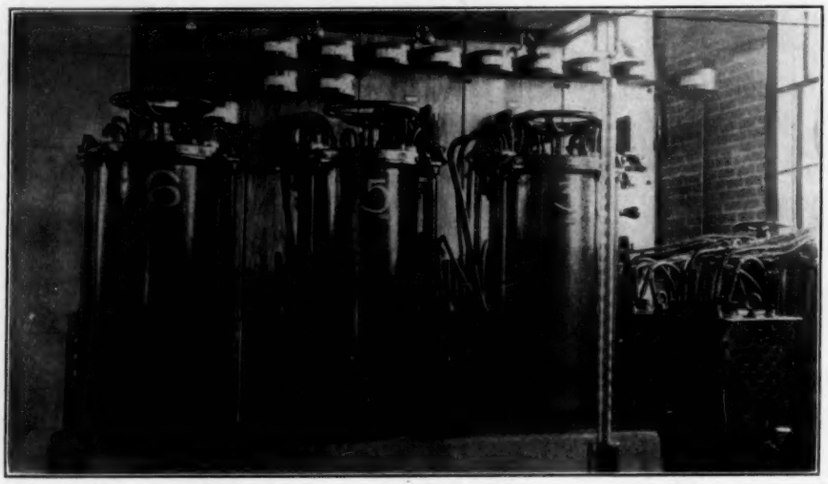


FIG. 4—LARGE, POTENTIAL TYPE STARTERS IN THE HOIST HOUSE

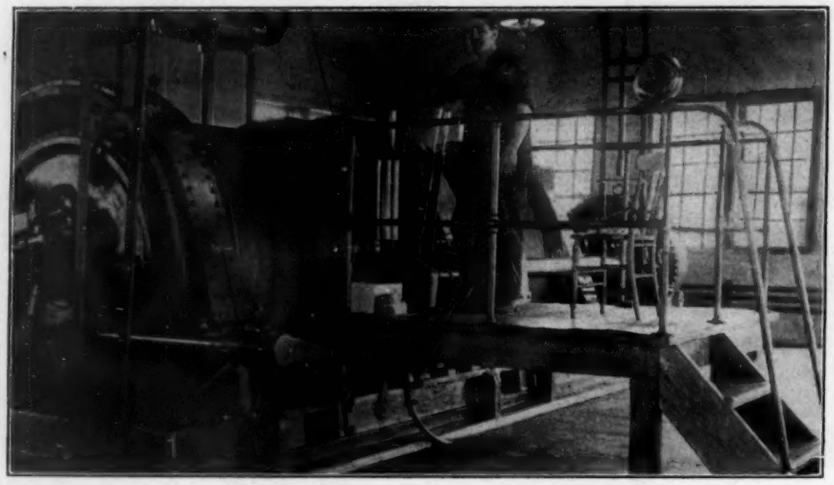


FIG. 3—THE 300-HORSEPOWER HOIST, CONTROLLED BY CUTLER-HAMMER, ALTERNATING CURRENT, SERIES RELAY CONTROLLER

Great Values in Government Coal Lands

During the past 3½ years the United States geological survey has classified as coal land 17,459,105 acres in the public land states, and this land has been restored to sale. The appraised value of this land, as fixed by the survey as the result of geologic examinations, and promulgated by the general land office aggregates a total of $742,620,649. The minimum valuation for the same lands, at which they might have been purchased a few years ago before the policy of classification was adopted, is but $295,989,140.

The necessary heights for chimneys for fuel oil plants are said to be much less than ordinarily supposed, when the boilers are operating at rating, and to be considerably greater than usually supposed when there are heavy overloads. A chimney of undue height causes an excessive quantity of air or combustion and forms an excessive load on the boilers, both resulting in a large waste of fuel.

Recent Development of Gas Power in Europe[1]

The Employment of Tar Oil as Fuel for Internal Combustion Engines, the Employment of Waste Gases and Their Purification by Various Systems

By H J Freyn

The development of the internal combustion engine in Europe during the last year has been very marked and great strides in advance were made, especially by the Diesel engine. The unparalleled progress of this prime mover, due primarily to the expiration of the basic Diesel patents, has created a wave of enthusiasm, the crest of which swept Europe only a short time ago. To the careful observer, however, signs of an ebbing of this wave are apparent and more sober and more healthy views are gaining ground.

Without desiring to in any sense detract from the importance of the Diesel engine my careful investigation has proved to me that the warning against over-enthusiasm, which I sounded about a year ago on a similar occasion, was fully warranted.

In this connection I refer more particularly to the large Diesel engine above 1,000-horsepower per unit, on which an extraordinary amount of rather optimistic reports and accounts appeared, within the last year or two, in the technical press of the world. I was somewhat disappointed to see that the actual achievements do not altogether coincide with these glowing accounts nor with the claims of some manufacturers who sometimes represent as accomplished facts the dreams of their most optimistic hours.

Diesel Marine Engines

It would mean carrying coal to Newcastle to dwell on the great importance of the Diesel engine for ship propulsion, and also to reiterate the difference in conditions which applies when the large stationary Diesel engine is considered. It may suffice if I state that the fuel-carrying capacity of a vessel is limited so that the fuel carried on a single trip becomes virtually priceless. Little wonder why great effort is today devoted, on the part of many manufacturers of marine Diesel engines in Europe, to the design and construction of an engine which, while giving nearly the same excellent fuel economy as the stationary engine, also will meet the severe requirements of simplicity, reliability and reduced first cost.

That the last condition is not yet fulfilled is shown by the fact, that according to authentic information, the cost of an 800-horsepower four-cylinder, two-cycle marine engine, recently built, was found to be 50 per cent higher than anticipated and 150 per cent higher than that of the corresponding steam engine equipment. I was unable to find anywhere the 10,000 and 15,000-horsepower Diesel engine ships of which I had read and even Diesel engine enthusiasts do not believe that our modern Leviathans will ever be propelled by Diesel engines.

Largest Single Engine

The largest single Diesel engine unit propelling any ship afloat develops not over 2,000-horsepower and there still remain many obstacles to be overcome before the single acting multi-cylinder, four-cycle or two-cycle Diesel engine on board ship is supplanted by the double-acting engine; vertical engines of the latter type are still in the experimental stage, and their future does not appear very promising on account of the serious mechanical complication of scavenging pumps and the multiplicity of scavenging valves in each cylinder head. The lack of the desired simplicity of these designs has prompted a number of inventors and manufacturers to experiment with the so-called *valveless*, two-cycle type, which presumably will become the large marine Diesel engine of the future. One valveless, two-cycle experimental engine of 260-horsepower is claimed to have operated on an oil consumption of only 0.375 pounds per indicated horsepower, which at a mechanical efficiency of 60 per cent would give 0.462 pounds per brake horsepower-hour; in other words, the economy was as good as that of a regular two-cycle engine with scavenging valves. The mean effective pressure obtained reached 125 pounds per square inch, which is truly remarkable in view of the extremely simple scavenging method employed.

Among the valveless, two-cycle engines, the Junkers oil engine has attracted a great deal of attention; it differs essentially from the regular type and has reciprocal pistons and a three-throw crankshaft; the excellence of the form of combustion space is a great advantage of this engine, and gives the distinction of being the best oil engine, at least from a thermo-dynamic point of view. Practical experience alone however, will tell whether its unusual design and certain mechanical disadvantages will be offset by this advantageous feature. One of the foremost authorities in Europe graphically characterized the Junkers engine as an oil engine built around a given perfect combustion chamber in contra-distinction to all other Diesel engines where it is attempted to provide a satisfactory combustion space in an existing engine. Much publicity was given the Junkers engine abroad and in this country and great interest was aroused everywhere, because of its unusual design, but only a few smaller engines, mostly for marine propulsion and of the twin or three-cylinder vertical type have been built abroad. The tandem arrangement of cylinders, which results in the same number of crank efforts realized in ordinary single cylinder, double-acting, two-cycle engines, has so far been applied only on two 800-horsepower, three-cylinder vertical engines to be fitted in a vessel of one of the largest steamship companies. Aside from the two experimental engines in Prof. Junker's famous laboratory, no horizontal engines of this type have been built and opinions abroad are much divided concerning the future of the stationary, horizontal, tandem Junkers engine.

Twin-Tandem Diesel Engine

It is not certain that the large Diesel engine above 1,000-horsepower per unit will be an undisputed commercial success abroad since the price of natural fuel oils steadily increases, largely limiting such engines to the use of tar oil. The horizontal, double-acting, four-cylinder, Diesel engine, in twin-tandem arrangement of 1,600-2,000-horsepower, which I had the privilege of examining at Halle, Germany, is a splendid piece of machinery and

[1]Presented at the New York meeting of the American Society of Mechanical Engineers.

operates apparently very satisfactorily on tar oil with a small addition of ignition oil. Although it is claimed that such an engine can be sold in Germany for from $30 to $32.50 per horsepower against $35 per horsepower for a steam plant, it should be expected that the repair and maintenance cost will be much higher than even that of our present gas engines on account of the high pressure and temperatures which are essential with the Diesel working principle and because of carbonization at partial loads which can be prevented only by scrupulous cleanliness. In countries where the price of coal is high this engine type may have some importance and a number of such engines of even larger unit capacity than the one mentioned was sold in France and Russia where fuel conditions are favorable for this type.

The small and medium Diesel engine, in sizes from 40 to 50 horsepower in single cylinder units, and up to about 600 horsepower in four-cylinder units, plays a vastly more important part abroad; it has unquestionably come to stay and has reached a high degree of perfection which places it in line with the corresponding steam and gas engine plant as far as reliability and cost of operation are concerned, and far ahead of its competitors when considered from the standpoint of fuel economy. It is amazing to note how many manufacturers of gas and steam engines abroad have taken up the manufacture of Diesel engines, because they found that the sale of suction gas producing plants and smaller steam engines has fallen off alarmingly within the last few years.

Efficiency of Diesel Units

The reason is plain. The single-acting, four-cycle, single or multi-cylinder Diesel engine is comparatively simple in construction and operation. This engine is always ready to be put into service at a moment's notice and has no stand by losses; it does not require up-keep and attendance of boilers or gas producers, and its cost compared with that of steam or gas plant is reasonable. Moreover, it can be installed in the basements of buildings below occupied dwellings, whereas in Europe boilers are not permitted in such places. One of the greatest advantages however, which can not easily be expressed in figures, but is of vast importance to the consumer, is the fact that the actual consumption of Diesel engines taken over long period of operation does not materially exceed the guaranteed figures, whereas in gas producer and steam plants, this excess is quite considerable. A German technical periodical contained, a few months ago, an article showing that the actual fuel consumption, during a period of one whole year was, for certain Diesel engine plants, only 14 per cent higher than the guaranteed figures given by the manufacturer, whereas it averaged 120 per cent more in high class steam plants. In this comparison 27 installations containing units of 50 to 80 horsepower were investigated, 12 of which were steam plants, whereas 15 contained Diesel engines. In a Diesel plant, the skill of the operator must have much less influence upon the fuel economy than in a steam or producer gas plant where everything depends upon the efficiency and intelligence of firemen and producer attendants.

Engines of the Horizontal Type

While the Diesel engine is originally a vertical engine, the last two or three years have witnessed a remarkable development of the horizontal type. With a few exceptions, the manufacturers of vertical Diesel engines have branched out to build horizontal units for purely commercial purposes. Experience shows that the fuel consumption is only very little, if any higher, than that of vertical engines, but the horizontal type is decidedly preferred by the customer, not only on account of its lower cost, but particularly owing to its greater simplicity and better accessibility. The horizontal Diesel engine with Lietzennayer's open fuel injection nozzle, especially offers these advantages in their full measure. The open nozzle is simpler, can be easier taken care of by unskilled attendants, gives better results when burning heavy oils and is less sensitive in its action than the so-called injection nozzle of the original Diesel engine. The horizontal open nozzle oil engine has the additional advantage that certain essential accessories such as the starting gear and the fuel pump, can be designed much simpler than for the other type. Many engines of the former type are in successful service, using all kinds of fuels and are installed for various purposes, such as for power transmission, for operating flour mills, for lighting factories, sanitariums, office buildings, department stores and for electric power plants.

The only difficulty of which some users of small and medium Diesel engines sometimes complain, is caused by the discharge valves of the air compressors for fuel injection, and although proper design and experience in the manufacture of these accessories have now reduced these difficulties to a minimum, numerous efforts are made by inventors and manufacturers to materialize the dream of the compressorless Diesel engine. I had the privilege of witnessing the operation of a 12-horsepower experimental engine of this type, which seemed to give good results, since an oil consumption of only 0.48 to 0.5 pound per horsepower-hour is claimed, but it is not certain that this principle, which has been tried many times before would be applicable for large engines.

If conditions in Europe are not altogether favorable for the development of the large Diesel engines, they are much less so in this country; the misapprehension frequently prevails not only among laymen, but even among engineers, that the Diesel engine must have a wonderful field of usefulness in countries where crude oil is produced in very large quantities, but such is not the case. The price of oil fuel in any locality must be considered in connection with the prevailing coal price to determine whether a Diesel engine installation is economically efficient or wasteful. Cheap oil fuel will favor the Diesel engine only where coal is very expensive as on the Pacific coast, whereas high oil and low coal prices will exclude it from any part of the country where such conditions exist.

Fuel Cost Important Item

Considering that the total cost of producing power is made up of a number of items, such as interest on the money invested and depreciation of the plant, cost of fuel, cost of attendance, maintenance and repairs, cost of supplies, etc., it is evident that in Europe, where fuel prices are from two to three times higher, while labor is only one-half to one-third of what it is in this country, the item of fuel cost constitutes a very high percentage of the total cost of power, particularly since the other items, such as interest and depreciation, attendance and repairs are actually much lower and thus form a still smaller percentage of the total cost.

With us, conditions are practically reversed. Our fuel cost is not only lower and our labor cost much higher than in Europe, but, moreover, the quality of our mechanical labor is not as good, and therefore the fuel cost plays a much less important role in the total cost of power than the items into which labor largely enters.

Many considerations, aside from the cost of fuel and labor, influence the commercial economy of Diesel

engine installations, but with the variety of conditions which prevail in this country, a large field of usefulness of the smaller and medium size Diesel engine is assured.

Oil producers in Europe have advanced the price of this commodity nearly 100 per cent in the last few years. Although this increased cost of fuel has somewhat retarded the steady growth of the Diesel engine industry, it has by no means been able to paralyze it. To utilize the available natural oil fuels more economically, the Diesel engine was invented and developed, but today conditions have changed as an adequate liquid fuel has been found in tar oil, a by-product of the distillation of coal.

To what extent the use of tar oil has expanded on the continent can be judged from the fact that France has to rely almost exclusively on the use of this Diesel engine fuel on account of the very high import duty on natural oils. In Germany, a number of collieries have combined to form a company for the utilization of tar which operates a large factory at Meiderich, where, at present, over 300,000 tons of tar are distilled annually, producing over 80,000 tons of tar oil. This is contracted for in large quantities at a price of approximately $12.50 per ton or 5 cents per gallon.

It is estimated that the total world production of coal tar oil is approximately 1,000,000 tons per annum, and since it is recognized that coal is too valuable a fuel to be wasted in our furnaces, the number of by-product coke oven and by-product gas producer plants will steadily increase, especially in our country, so that the total production of tar oil is certain to soon double and treble. The heat value of tar oil is over 17,000 B. T. U.'s per pound, and the cost of its consumption in the Diesel engine is, therefore, not very much higher than that of natural oil.

Gas Turbine

There is renewed activity abroad in the design of an adequate gas turbine, and I noticed that much interest is taken in this question by the most prominent manufacturing concerns in Europe. The foremost authorities are convinced that the gas turbine will be developed soon, and it will revolutionize power production in the large steel centers and wherever natural fuel oils abound in this country.

The apparently inexhaustive supply of cheap coals, lignites and peat, and especially of crude oil, make the future of the gas turbine in the United States much more promising than in Europe. Unfortunately, we do not possess as high a class of labor as Germany, for instance, where the education of centuries has resulted in a quality of mechanical labor unsurpassed for manufacturing and taking care of thermally highly economical, but mechanically rather complicated machinery.

The gas turbine is destined to bridge the chasm between the gas engine and the steam turbine, if after proper development it should eventually approach the economy of the gas engine, for it shares with the steam turbine the advantages of low cost, large unit capacity, reduced unit weight, small floor space, high speed and simplicity of operation and maintenance, whereas its better thermal efficiency will make it a serious competitor in plants where gas engines are now used. A large experimental gas turbine in Germany is operating satisfactorily, although the problem of thermal efficiency still remains to be solved.

Utilization of Waste Gases

The use of industrial waste gases has progressed rapidly. The four most prominent manufacturers in Germany are now building large gas engines for blast furnace and steel works at the rate of 120 per year, and a number of twin-tandem engines of 5,000 horsepower operating very satisfactorily on rich coke oven gas, can now be seen in German coking plants. The splendid results obtained with gas blowing engines in Germany have prevented the turbo-blower from getting a firm foothold in that country, although its use in France, England and Russia is steadily increasing.

Blast furnace gas engines for blowing and electric power purposes, and even for operating rolling mills, are today the standard equipment for old and new plants, even where the coal price is fully as low as in the Pittsburgh district. Within the last two years the use of coke oven gas for producing electric power by gas engines has greatly increased and after overcoming the many earlier difficulties, the coke oven gas engine is today just as safe and reliable as the blast furnace gas engine. These difficulties principally arose from overrating the engines and from sulphur in the gas. Since the reasons for the trouble were recognized the causes, or their consequences, are now avoided, so that in a number of plants sulphur of considerably over one grain per cubic foot of gas is very successfully handled in coke oven gas engines if the proper precautions are taken.

The most prominent German gas engine builders are now building their engines on a combination quantity-quality principle. The valve gear has been much simplified by all manufacturers, resulting not only in a reduction of the cost of manufacture, but also of operation, and gas engine prices generally are lower than they ever were before. The gas cylinders, after a few unsatisfactory attempts to use cast steel, are invariably made of cast iron and with the exception of a few types, are cast in one piece with hard cast iron liners. The cracking of gas cylinders, which formerly occurred too frequently after a short time of operation, is now much reduced by proper design, selected material and better pouring methods. Experience has taught that the life of a gas cylinder can be materially increased if the water jackets are thoroughly cleaned from all scale and muddy deposits at regular intervals of from 4 to 8 weeks, depending upon the character of the cooling water used. This is a question of the greatest importance and should be given more consideration in this country. It was found by experiment that the average temperature of the cylinder wall increases at an amazing rate with even a very thin layer of scale in the water jacket, and in certain plants, with hard cooling water, acid and wire brushes are used to remove the accumulated scale from the cylinder walls. Gas cylinders on electric engines crack much more frequently than on blowing engines, because the former carry much higher loads than the latter and electric engines are shutdown more frequently than blowing engines.

Cracking of Cylinders

It was found that frequent shutting down and starting of gas engines shortened the life of the cylinders materially if the engines were allowed to cool off too much during these idle periods.

An improved method of arranging for very efficient water-cooling of the cylinders, especially near the dangerous parts, has been adopted and one or two concerns have tried to prevent the cracking of gas cylinders through the inlet and outlet ports by changing the location of the valve seats, making the latter flush with the cylinder bore. This provision does not seem, however, to have obviated the trouble since other difficulties of serious nature arose. The majority of the builders are, therefore, adhering to the one-piece cast iron gas cylinder with onion-shaped inlet and exhaust ports. The average life of a gas cylinder in the large steel plants

in Germany is estimated at from five to six years.

The cost of producing electric power in German blast furnace and steel plants is about $2.70 per 1,000 kilowatt-hours, including $1.25 as the value of the blast furnace gas and including cost of gas cleaning, labor, repairs and supplies of all kinds, but without interest and depreciation. This figure is based on an annual output of about 100,000,000 kilowatt-hours and a use factor of approximately 60 per cent.

The gas pistons generally are ribless iron castings, although for large engines cast steel is used. One concern recently has introduced one piece solid, non-cooled, forged steel pistons. The piston rods usually are made of open-hearth steel of about 100,000 pounds tensile strength, uncambered, and their diameter is approximately 20 per cent of the diameter of the gas cylinders. A variety of piston rod coupling designs is used, but the threaded connection is in greatest favor.

The crossheads are made of forged nickel steel. No uniformity of design can be claimed for piston rod packings, but they invariably consist of single or double sectional cast iron packing rings pressed against the rod by garter springs and separated by solid one-piece rings forming from 12 to 14 chambers. It is universally claimed that the clearances of the ring sections must be reduced to the minimum. So-called fire rings are sometimes used, but several builders object to such solid rings. The exhaust valves are made of forged steel or of Durana metal and are now almost exclusively of the non-cooled, mushroom type. Some builders, however, still prefer water-cooled exhaust valves for coke oven gas engines.

Blast Furnace Gas Purification

The progress of the large gas engine in Europe has been accompanied by great improvements in the method of purifying blast furnace gas. Until recently two systems of cleaning gas for engine purposes were in use, both of the so-called dynamic type, and using considerable quantities of water; the hydraulic fan and the Theisen washer. Results obtained with these appliances, as to cleansing efficiency and cost of operation are satisfactory. Nevertheless, they now are superseded in Europe by new processes, which still further reduce, not only the cost of installation, but principally the cost of purification on account of the smaller power and water consumption.

One of these new methods is a radical departure from the former wet-cleaning process and operates on the principle of filtering the gas in a dry condition, so that no water is required except that necessary to cool the engine gas to atmospheric temperature.

The filtering is accomplished by filter bags, which are made of special fabric and are suspended vertically in several air-tight compartments. The raw gas from the blast furnace is first cooled by radiation to about dew point, approximately 130 degrees Fahr.; it is superheated approximately 20 to 30 degrees by using any available source of heat, such as waste heat from gas engines, exhaust steam or even the sensible heat of the raw blast furnace gas itself. By cooling the gas a large amount of moisture is removed and the scorching or burning of the filter bags is prevented, whereas the subsequent superheating avoids condensation of the remaining vapor and the clogging of the bags.

Use of Filter Bags

The raw gas, under the action of a fan, passes from the inside to the outside of the filter bags, depositing all impurities on the surface. The layer of dust increases continually and would eventually render the bags impenetrable, were it not for an automatic mechanism which shakes the bags at regular intervals of about four minutes and causes the dust to drop off. Simultaneously the compartment which is to be cleaned is separated automatically from the others, and the direction of the gas current is reversed; the purified gas surrounding the filter bags then enters the latter, opening the pores of the filter material, which were closed previously by the passing gas current. The dust shaken off, the filter bag falls into a receptacle, from which it is removed in a dry condition.

Two experimental filter plants have capacities of about 10,000 and 14,000 cubic feet of gas per minute and clean the gas for gas engines only. It is claimed that the power consumption is 2.5 to 3 times lower than that of hydraulic fans and Theisen washers; that the water consumption is only one-fifth to one-sixth of the corresponding requirements of wet-cleaning plants, and that the dust contents in the purified gas are below 0.0004 grains per cubic foot, or 15 to 30 times lower than in the purified gas obtained with the older wet cleaning apparatus. The cost of operation, furthermore, is claimed to be much lower and the cost of installation only a little, if any, higher.

In certain districts of Germany and Luxemburg, water is exceedingly scarce, and the laws against river contamination are so strict that large sums of money have to be spent in these districts to purify the washing water before it can be disposed of. Settling tanks of large capacity have to be installed, and the disposal of the mud presents great difficulties and is costly; furthermore, flue dust in a moistened condition, is of no use except as filling-in material and since it contains large percentages of iron ore, its disposal in such a way is rather wasteful.

On the strength of the satisfactory results obtained, many blast furnace plants in the Minette district, and even in Westphalia, are preparing to install gas filtering plants, varying in capacity from 17,500 to 140,000 cubic feet of gas per minute. One manufacturing concern alone, which acquired the rights for Germany, in the month of July had orders for the installation of 21 plants, with a total capacity of 825,000 cubic feet of gas per minute.

The other new system of gas cleaning makes use of the disintegrator principle; two well-known concerns in Germany, specializing in gas washing apparatus, have developed this system on somewhat different lines, and one of them claims to have orders on hand for disintegrator gas washers capable of purifying 1,750,000 cubic feet of gas per minute. One machine only is used for the preliminary purification of boiler and stove gas, which is reduced from 2 to 3 grains to 0.088 to 0.175 grain of dust per cubic foot, with a water consumption of only 10 gallons and a power consumption not exceeding 0.072 horsepower per 1,000 cubic feet; for gas engine purposes two disintegrators are placed in tandem increasing the power consumption to 0.13 horsepower and the water consumption to 18 gallons per 1,000 cubic feet. However, the amount of dust in the gas drops to 0.0044 grain per cubic foot.

Gas Producer for Power Purposes

No change has taken place in the method of purifying coke-oven gas; bog or swamp ores are still used for sulphur cleaning, although one plant has succeeded in overcoming the disadvantage of occasional regeneration of this material by alternate exposure to the air.

It seems extraordinary, that in spite of the high price of coal, the development of the gas producer for power purposes has not kept pace with that of the gas engine in European countries. For many years the Mond gas producer with sulphate of ammonia

recovery has been used extensively in England, and recently much interest has been displayed in Germany in such plants which offer material financial advantages over ordinary gas producer installations. Since a large amount of sulphate of ammonia finds a ready market as an artificial fertilizer, the cost of gas making is considerably reduced, and installations are known where the saving thus effected amounts to $2 per ton of coal, which, in many cases, is as much as, or more than the value of the coal itself. The gas manufactured in such plants has a heat value of about 150 B. T. U. per cubic foot, and is of uniform quality; on account of the removal of tar and dust, it is particularly adapted to gas engines, but its low cost makes its use profitable for all kinds of metallurgical purposes, such as heating and annealing, calcining, roasting, distilling, etc.

The Coke Situation

The growing demand for coke, which is proportionate to the world's increasing pig iron production, has resulted in a remarkable increase in coke oven plant activity. The day of the wasteful bee-hive coke oven is passing, and the highly economical by-product coke oven is gradually taking its place. The manufacture of coke entails the accumulation of large quantities of coke braize which cannot always be disposed of easily. Successful attempts were made recently in Europe to gasify this coke dust in special gas producers. One system operates with liquid slag, whereas the other adapts a well known European producer design to the special requirements of gasification of fine fuels. In a number of European blast furnace and coke oven plants, this coke braize will be gasified in such producers, and the resulting gas of about 150 B. T. U. per cubic foot, will be admixed to the blast furnace gas, to improve its quality.

Mixtures of industrial gases are being used more extensively abroad for metallurgical and power purposes; in one plant in England a mixture of blast furnace and coke oven gas is used for heating and to operate gas engines. It may seem difficult to obtain a sufficiently uniform mixture of two gases so different in specific gravity, but experience has shown that modern blast furnace gas washers of the revolving type, such as fans, Theisen washers and disintegrators are splendidly adapted to this purpose, and that changes in the quality and heat value of the mixed gas, of even considerable magnitude, do not seriously affect the operation of gas engines.

In one European steel plant, another interesting novelty of perhaps great importance for future gas engine application has been introduced. It consists of overloading four-cycle gas engines 25 to 35 per cent above their normal capacity. The method devised by one of the foremost gas engine manufacturers in Germany consists of scavenging the gas and introducing the fresh mixture under a pressure somewhat higher than atmospheric. This is achieved by scavenging the spent gases of the previous power stroke with a blast of this air and subsequently introducing gas and air under slight pressure into the combustion chamber. By utilizing the waste heat of the gas engines for raising steam in waste heat boilers and driving steam turbines direct-connected to the turbo-blowers, the power requirements of the auxiliaries can be supplied without resorting to outside sources of power, nor detracting from the increased output of the gas engine generator.

An overload of 35 per cent was attained without raising the initial pressure and without an appreciable increase of the heat absorbed by the cooling water; the thermal efficiency of the scavenged engine was found to be somewhat better, and the mechanical efficiency considerably better than that of the non-scavenged engine.

In another steel plant two tandem engines of 1,360 kilowatt normal rating were provided with generators of 1,700 kilowatt capacity in anticipation of the overload scheme. They now can carry loads of 1,800 to 2,000 kilowatts. Before the changes were made in April, this year, the average kilowatt output per engine in 12 hours, as ascertained from the log book, was 13,000 kilowatt-hours, but since installing the scavenging plant, the average output was increased to 18,000 and 20,000 kilowatt-hours in a 12-hour run, corresponding to an average increase of approximately 40 per cent. The capacity of an existing gas engine plant can be increased 30 per cent, provided the generators are large enough, at a considerable saving compared with the cost of providing for this increase in capacity by installing additional non-scavenged units.

In this country gas power development has not been as satisfactory as in Europe, where economical conditions are more favorable to the factory employment of gas power. The growing appreciation of the prevailing wasteful methods of utilizing our fuel resources, the increasing demand for cheap power and the gradual mechanical perfection of the internal combustion engine, in the course of time will bring about conditions in this country favoring the more extensive use of gas power.

Great Copper Reserve

The copper industry in the United States has shown a notable growth, according to the United States geological survey. In 1845, when important production of copper in this country practically began, the output was but 224,000 pounds, but it increased 100 per cent the following year and gained by rapid strides until 1850, when the production was 1,456,000 pounds. In 1870 it was 28,224,000 pounds; in 1890, it was 259,763,092 pounds; in 1900, it had increased to 606,117,166 pounds; in 1909, it passed the billion mark, with 1,092,951,624 pounds; and in 1911, it exceeded all previous records with a production of 1,097,232,749 pounds. The world's production in 1911 was 1,958,201,285 pounds, of which 56 per cent was the output of the United States.

It is noteworthy that, unlike areas producing most other metals, not one of the leading copper districts of the United States, several of which have been active producers for a period of 30 years or more, has been worked out or showed a marked decrease in its ability to produce copper. Twelve districts situated in eight states have each contributed over 100,000,000 pounds to the copper output of the country, or a total of 94 per cent of the whole output of the United States since 1845. Four of these districts are in Arizona, two in California, and one each in Montana, Michigan, Nevada, New Mexico, Tennessee and Utah. Two districts stand out prominently, the Butte district, Montana, which has contributed over one-third of the output of the country, and the Lake Superior district, Michigan, with a production of a little less than one-third of the total output.

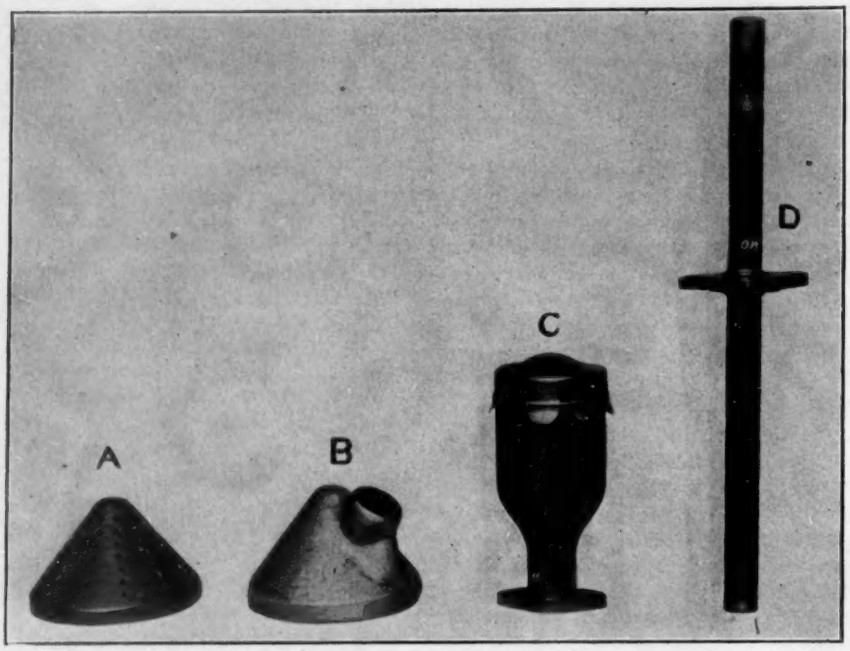
One of the most serious effects of smoke upon metal work, is the corrosion of structural steel. Several collapses of iron roof trusses in England, notably that of the Charing Cross station, are said to have resulted from this cause. In some instances it was found that about 10 per cent of iron had been dissolved into ferrous sulphate. The corrosion of uncovered iron or steel wire has also been observed and found to be extensive during 1911.

Stamping Automobile Parts

The standardization of automobile and autocycle parts that has accompanied the development and growth of those industries, has led to a change in the method of manufacturing different pieces that enter into the construction, and this improvement is particularly noticeable in pieces stamped or drawn from sheet metal. In the accompanying illustration are shown four stampings, made recently by the Acklin Stamping Co., Toledo, O., showing some of the results now being obtained.

A motor-cycle muffler cone made from 3-32-inch steel is shown at *A*, on which the taper sides are true and straight, and a uniform thickness of metal has been retained. The walls contain 12 rows of holes, perforated by an automatic fixture insuring uniform spacing. The cone is strong and stiff, and can withstand the sudden pressures to which it is subjected without cracking. At *B* is shown another cone that is used as the base of *A*. A boss, 13-16 inch high, is formed down from the wall of this cone, being produced with several operations, but the stamping eliminates the machining of a casting, and the cost of the finished piece is said to be lower. The piece, *C*, is a combined breather and oil filler for automobile crank cases. This is made from No. 16 gage steel, flat bank, and is drawn to a depth of 5 inches. This is a good example of results obtained with modern stamping methods. The top diameter is 2½ inches, the piece being necked in at the bottom to 1 inch diameter, and the lower flange is clinched onto the shell by a shoulder at each side. An air intake is provided in the cap by eight slots, four of which may be closed by revolving the cap slightly, bringing certain slots in line with projections on the inner shell. The cap and shell each have a circular bead, by which the cap is locked, and the natural spring in the metal holds the cap in place without rattling.

An oil gage housing, shown at *D*, is used in place of an aluminum casting that was difficult to produce. The stamping, the main body of which is a butt-joint tube with the top partially closed in, is assembled easily and does not require machining. The flange and washer are separate stampings, firmly clinched in position by beads upset on the tube, both above and below.



STAMPED PARTS FOR AUTOMOBILES

Pennsylvania Leads in Minerals

Pennsylvania far outranks all other states in the value of its mineral output. In 1911 this state contributed, exclusive of pig iron, 24.7 per cent of the total mineral output of the United States. The reason for Pennsylvania's undisputed leadership lies primarily, according to the United States geological survey, in its great production of coal. It is almost exclusively the source of anthracite, and produces over one-third of the total bituminous output. Pennsylvania ranks second, next to New York, in the value of its manufactures, and stands first as a mineral producer in cement, coal, coke, pig iron, lime, mineral paints, sand and gravel and building stone.

Resuscitation With the Pulmotor

Although the pulmotor, an automatic device for producing artificial respiration, received attention first in this country from the mining industry, as a means to be employed in rescue work in mines, its use during the past three years has been extended considerably, and it is now becoming recognized generally as an efficient aid in resuscitation work of many kinds. According to the Draeger Oxygen Apparatus Co., Pittsburgh, maker of the device, probably one of the first experimental installations by public service corporations, which have since used them extensively, was made by the Commonwealth Edison Co., Chicago, which used the pulmotor in the winter of 1911-1912. During that time it is said that about 100 successful resuscitations were accomplished. In some of these cases, respiration had ceased entirely, and no heart action could be detected.

Following installations such as this, which were successful in treating cases of gas asphyxia and electric shock, various metallurgical plants throughout the country tried them. Some of the industrial corporations that are now using them include the United States Steel Corporation, Youngstown Sheet & Tube Co., Louisville Gas Co., and others. As an example of its usefulness around steel plants, an instance is cited of an employe of the Youngstown Sheet & Tube Co., a gas man at the tube mill gas producers, who was overcome by gas and was practically in a lifeless state when brought to the hospital. After the pulmotor had been in operation on him for about eight minutes, the man revived. In the case of the Louisville Gas Co., a man who had been overcome by electric shock was brought there for treatment. Before the pulmotor was tried the man was placed on the operating table, the doctors working over him for sometime, after which he was pronounced dead. The machine was then tried and about seven minutes after, he commenced breathing. It is claimed for the device, that it can be successfully operated by an inexperienced man, although a competent physician is preferable. It is automatic and carries on the resuscitation work independent of the operator, after being applied properly.

The Hauck Mfg. Co., Brooklyn, N. Y., manufacturer of kerosene torches and oil-burning appliances, has established a Pacific coast branch at 24 California street, San Francisco, in charge of George P. Kittel.

Electric Furnace Methods of Steel Production--VI

The Design and Construction of the Frick, Gronwall and Hiorth Furnaces With Details of Their Operating Ecconomies

By John B C Kershaw

The previous articles of this series contained descriptions of the five electric furnaces for steel refining that have been in the longest use and which have been most extensively installed. The writer will now discuss various types of furnaces which have not proved so successful as the melting mediums previously considered, but which are, none the less, deserving of study and attention. These furnaces have been designed and built, with the data derived from the earlier experiments to guide and warn their patentees, and it is quite possible that some of them may prove of higher efficiency and may be found capable of more economical operation than any that have preceded them.

The information relating to these furnaces and to their operating costs is, of course, not so voluminous as that of the better known types, and in some cases there is little data available for arriving at any just estimate of their practical value for steel refining purposes. This and the following article will contain detailed descriptions of the more important of these furnaces and processes.

The Frick refining furnace is of the induction type, and differs only in comparatively unimportant details from the Kjellin and Colby furnaces. The Frick furnace consists (1) of a ring-shaped crucible of uniform cross-section, holding the molten metal and forming the secondary coil of the transformer; (2) of a magnetic core, built of laminated iron, forming a closed magnetic circuit around the coils; and (3) of two primary coils of insulated copper ribbon, mounted one above and one below the crucible, on the magnetic core. These coils may be wound for any desired voltage up to 6,600 volts.

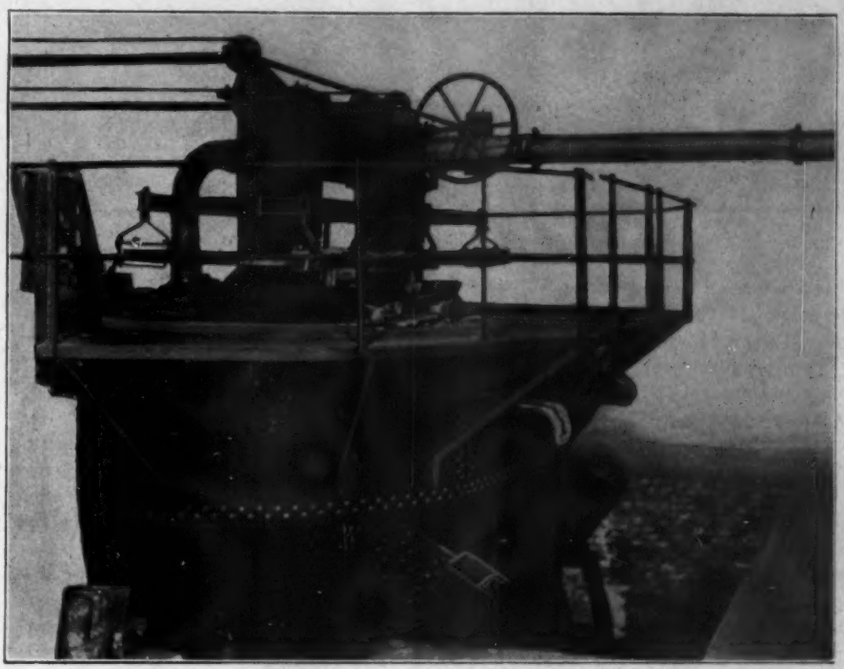


FIG. 2—ANOTHER VIEW OF THE HIORTH FURNACE, SHOWING THE TAPPING SPOUT AND TILTING ARRANGEMENT

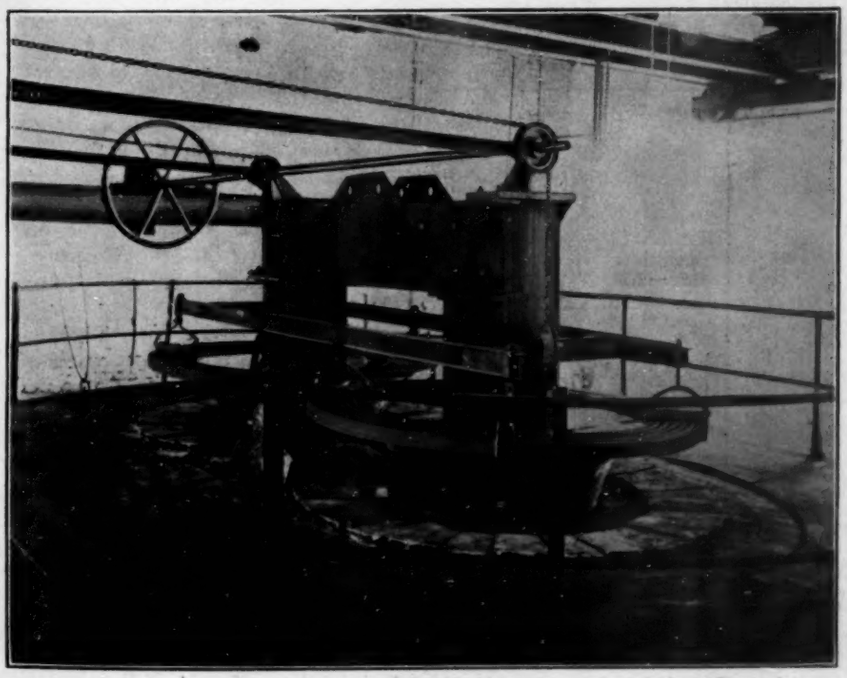


FIG. 1—PLATFORM VIEW OF 5-TON HIORTH FURNACE

Fig. 4 is a diagrammatic section of the Frick furnace, one of this type having been built for Fried. Krupp, Essen, Germany, in January, 1910. This furnace had a capacity of 20 tons of steel per day, having been charged with cold scrap, and required about 6½ hours to melt and refine each 6½-ton charge.

The power required was approximately 1 kilowatt-hour for 3 pounds of steel refined, or 665 kilowatt-hours per ton. To obtain a reasonably high power factor, a special low-frequency current of from 5 to 15 cycles was used, and an engine-driven generator, designed to furnish this low frequency, single-phase current, was employed. The electrical power supplied

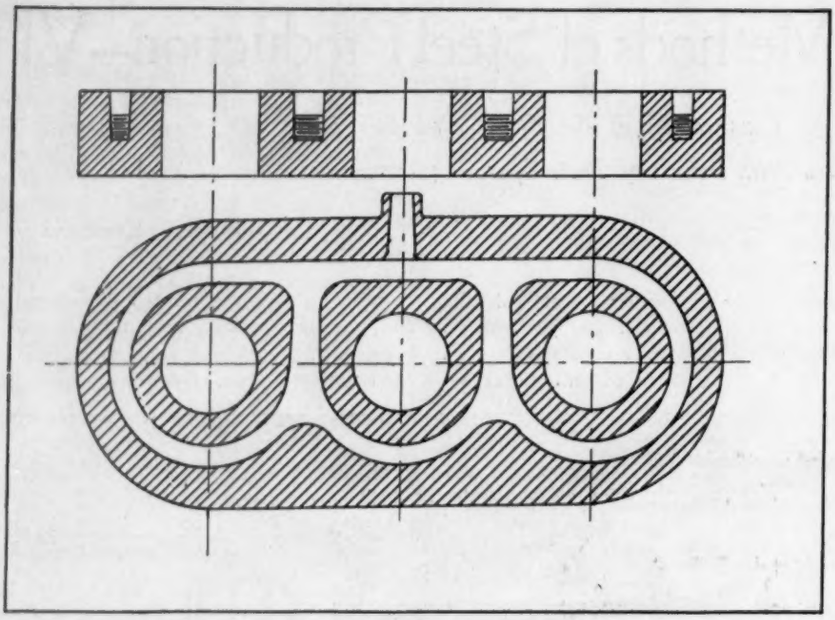


FIG. 3—PLAN OF HIORTH'S 30-TON FURNACE

was controlled by regulating the generator voltage. The electric efficiency was said to be about 65 per cent.

The power consumed in melting the material, consisting of cold metal and slag, to approximately 1,500 degrees Cent., in a 10-ton furnace, was about 600 kilowatt-hours per ton, or 0.3 kilowatt-hours per pound. The power consumed for refining the steel, after melting, was from 1,800 to 2,000 kilowatt-hours for a 10-ton charge, or approximately 0.1 kilowatt-hour per pound.

It should be noted that no other data beyond that given have been published concerning the design or operation of the Frick induction furnace. Although two other furnaces are reported to be in operation at the works of John Brown & Co. and William Jessop & Sons, Sheffield, Eng., no data are available concerning their size or efficiency.

The Gronwall furnace is of the arc type and has been designed by the three Swedish engineers, Messrs. Gronwall, Linblad and Stalhane, who have been responsible for the design and operation of the successful electric iron smelting furnaces at Ludvika and Trollhatten, Sweden. The Gronwall furnace is of the two electrode arc type, and in principle and appearance differs only slightly from the Girod and Heroult furnaces. The bottom of the furnace, however, is provided with a conducting lining and the current passes through the molten metal when two-phase current is employed, the hearth being made the neutral return of the system. The advantages of this plan are that two-phase current is cheaper to generate and more easily controlled than single phase, while it also produces more circulation in the bath of molten metal.

Figs. 6 and 8 show sectional elevations of the furnace at right angles to each other. The furnace is built upon the curved cast iron plates which form its shell, a lining of magnesite bricks being employed between the ordinary basic lining and the shell of the furnace. The two electrodes are suspended as shown in Fig. 8, and hang with their free ends just above the molten slag or metal. In the larger furnaces, at the point where the electrodes pass through the furnace crown, they are water-cooled. The furnace can be tilted by aid of the mechanism shown in Fig. 8.

The carbon block forming the lower terminal of the furnace is fixed in a casting bolted to the furnace bottom.

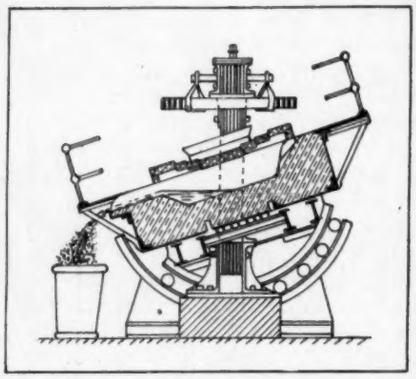


FIG. 5 — SECTIONAL VIEW OF THE HIORTH FURNACE TILTED

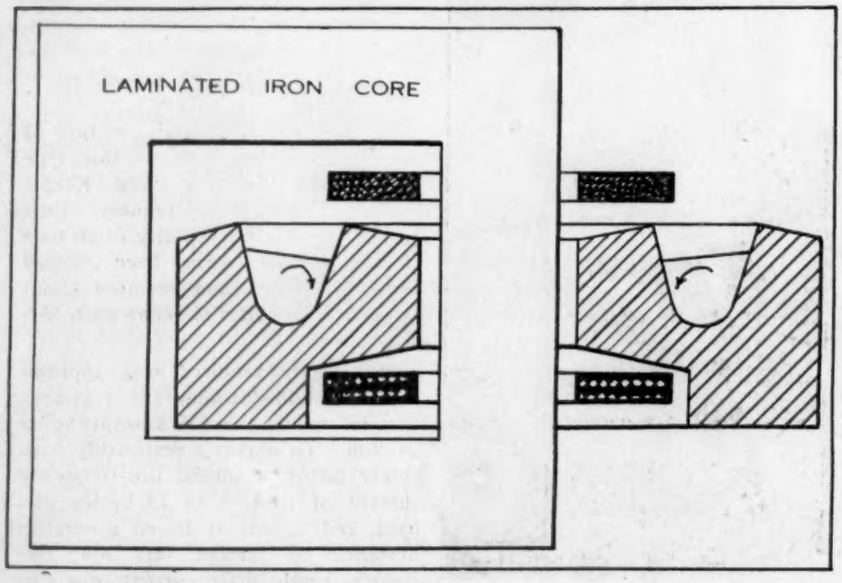


FIG. 4—DIAGRAMMATIC ILLUSTRATION OF THE PRINCIPLE OF THE FRICK INDUCTION FURNACE

The top of this bottom electrode does not project above the magnesite brickwork, and therefore, it does not weaken the basic lining of the furnace. The roof consists of a channel iron framework supporting the silica brick, and can be removed from the furnace and repaired when necessary, a new roof being always kept in reserve ready for use.

The special feature of the electrode holders is that the electrical contact is made low down, just above the furnace roof; this reduces the energy losses due to the internal resistance of the electrode. The holder consists of iron castings and steel T sections. Owing to the use of two-phase current, and to the fact that each phase is connected to one of the top electrodes, the arcs are formed independently of each other; and even if one arc is broken, the other remains. In other arc furnaces, with the arcs in series, when one arc is in-

terrupted the other is also extinguished, and this leads to disturbance in the supply system.

The details of the process of steel refining in the Gronwall furnace are the same as in the Girod, Heroult and Keller types, the high temperature obtainable leading to good purification, and the good circulation to uniform quality of the steel produced. No figures, however, are available showing the power consumption per ton of finished steel, or the costs of the refining process. These should be rather lower than the corresponding figures for the other furnaces of the arc type, owing to the economies resulting from the use of two-phase current, from steadiness in working and from the more uniform distribution of heat throughout the charge. The Gronwall furnace has been installed at the electric iron and steel works of the Aktiebolaget Elektrometall, Ludvika, Sweden.

The Hiorth furnace is the invention of Albert Hiorth, of Christiana,

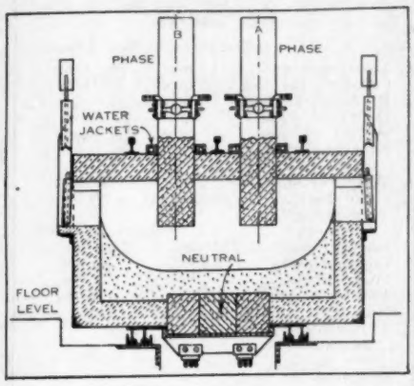


FIG. 6—CROSS-SECTION OF THE GRONWALL FURNACE

Norway, and is an improved form of the induction type. A 5-ton furnace has been operated at the plant of the Jossingfjord Mfg. Co., Jossingfjord, Norway, since the spring of 1910, and the experience gained with this 5-ton furnace has been utilized in designing a larger furnace of 30 tons capacity. This 30-ton furnace, so far as the writer can learn, is not yet in operation, and the following description of the smaller furnace, is drawn chiefly from J. W. Richards' paper, read at the Chicago meeting of the American Electro-Chemical Society.

The Jossingfjord works are provided with a 500-kilowatt generator driven by a Pelton wheel, and the power here costs only $4.25 per horsepower-year. The 5-ton furnace is of the double-channelled, induction type, with a primary consisting of four coils connected in series. Fig. 7 shows the diagram of electric units, *E* being the steel bath, with its two channels,

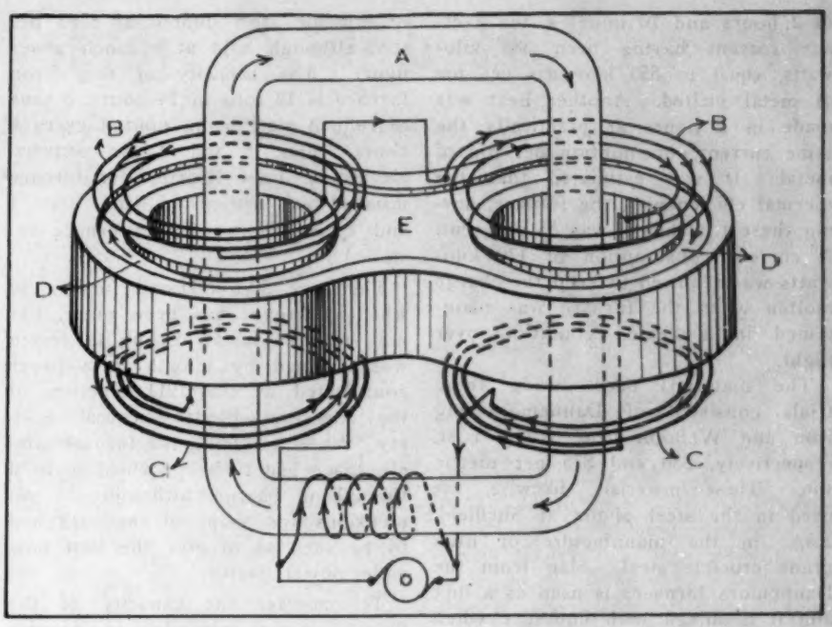


FIG. 7—DIAGRAM OF ELECTRIC CIRCUITS OF THE HIORTH FURNACE

D; *A* is the magnetic circuit; *B*, the upper coils co-extensive with the heating channels, and *C*, the lower coils. The coils, *B*, are suspended from pulleys with flexible connections, and when operating, are pressed closely against the covers of the channels, *D*, but can be raised about 29 inches when the covers are to be removed. The coils, *B*, are non-insulated bare copper bars, coiled spirally. The coils, *C*, are hollow, water-cooled copper conductors, and in the actual furnace are embedded in the magnesite lining about 16 inches beneath the channels, *D*. The voltage employed on the primary is so low that no particular precautions for installation are needed, and no one can be seriously hurt by it. The space between the magnet, *A*, and the furnace wall is 12 inches, which permits the magnets, which weigh several tons, to be bolted firmly to the floor, while the furnace can be tilted for pouring. The central space, *E*, is 12 inches wide in the center, 24 inches wide at the sides, and nearly 76 inches long from front to back. It provides sufficient space to remelt ingots or other scrap.

Steel can be refined in this furnace in approximately 2 hours. When one trial heat was made, the furnace contained 2,775 kilograms of steel from the previous charge, of approximately 1 per cent carbon content. To this was added 1,000 kilograms of pig iron and 500 kilograms of high grade wrought iron. The charge was melted

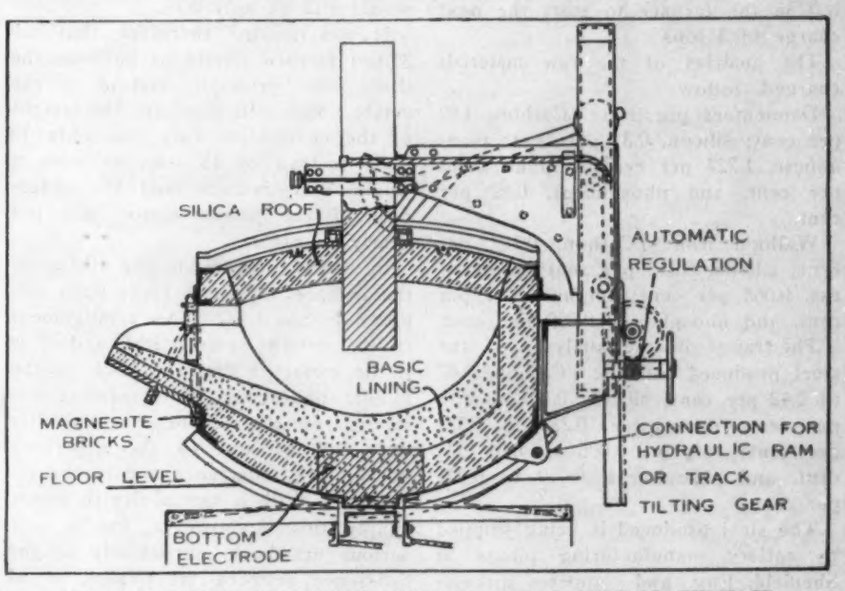


FIG. 8—ANOTHER SECTIONAL VIEW OF THE GRONWALL FURNACE

in 2 hours and 10 minutes, the average current having been 380 kilowatts, equal to 550 kilowatts per ton of metal melted. Another heat was made in 2 hours at practically the same current consumption per ton of metal. It was estimated that the thermal efficiency of the furnace, during these trial heats, was 55 per cent. A current consumption of 170 kilowatts was required to keep the charge molten when the furnace was maintained in a heated condition over night.

The materials used during these trials consisted of Dannemora pig iron and Walloon iron, which cost, respectively, $30 and $75 per metric ton. These materials, likewise, are used in the steel plants at Sheffield, Eng., in the manufacture of high grade crucible steel. Slag from the Dannemora furnaces is used as a flux and it is mixed with fluorspar when greater fluidity is desired. Although 5 tons of steel are melted in the furnace, only 3 tons are tapped after

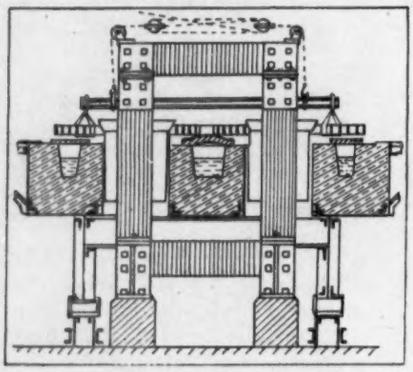


FIG. 9—SECTION OF THE HIORTH 5-TON FURNACE AT JOSSINGFJORD

each heat, the remaining 2 tons being left in the furnace to start the next charge of 3 tons.

The analyses of the raw materials charged, follow:

Dannemora pig iron: Carbon, 3.80 per cent; silicon, 0.31 per cent; manganese, 1.727 per cent; sulphur, 0.025 per cent, and phosphorus, 0.02 per cent.

Walloon iron: Carbon, 0.107 per cent; silicon, 0.013 per cent; manganese, 0.068 per cent; sulphur, 0.01 per cent, and phosphorus, 0.009 per cent.

The range in the analyses of the steel produced follows: Carbon, 0.67 to 1.42 per cent; silicon, 0.107 to 0.13 per cent; manganese, 0.253 to 0.322 per cent; sulphur, 0.006 to 0.01 per cent, and phosphorus, 0.019 to 0.021 per cent.

The steel produced is being shipped to cutlery manufacturing plants at Sheffield, Eng., and competes successfully, in quality, with the best grades of crucible steel quoted at $293 per ton, although sold at a much lower figure. The capacity of this 5-ton furnace is 12 tons in 24 hours, 3 tons of refined steel being poured every 6 hours. Figs. 5 and 9 are sectional elevations of the Hiorth, 5-ton furnace installed at Jossingfiord, and Figs. 1 and 2 are views of the furnace installed.

The large, 30-ton Hiorth furnace, to which reference has been made, has not yet been installed, but its design was outlined by Hiorth in a paper contributed at the 1911 meeting of the American Electro-Chemical Society. When designing the furnace, ample space had to be provided to hold the 30-ton charge, although the dimensions and shape of the bath had to be such as to give the best possible power factor.

To increase the capacity of the furnace, it was necessary to increase the sectional area of the bath more than the length, as otherwise the diameter of the bath, and consequently the dimensions of the furnace, would become too large. The resistance of the bath would thus be considerably decreased, and at the same time the inductance would be increased, owing to the large diameter, which increased the area of the space between the primary and the secondary windings.

The power factor thus would be reduced with the increased capacity, and the designer calculated that a 30-ton furnace built on the same lines as the smaller one, for single-phase current, with a two-leg magnet and a current supply with 25 alternations, would show a power factor equal only to 0.25, and that the power factor even with 15 alternations per second, would still be only 0.38.

It was decided, therefore, that the 30-ton furnace should be built on the three-phase principle, instead of the single phase. In this case the weight of the charge per ring was only 10 tons, instead of 15 tons as with a single-phase furnace, and the reduction of the power factor was not nearly so great.

In order to facilitate the tilting of the furnace, the three rings were disposed in one row. This arrangement is not strictly symmetrical, and it is to be expected that the load on the middle phase will be somewhat different from the load on the two outer ones, on account of the difference both in the inductance and in the resistance. With a special electric power supply this is, however, not a very serious drawback, particularly as the difference between the phases, in all probability, will not be very great. The furnace as designed, is shown in plan, in Fig. 3 and a comparison of the more important dimensions of the 5-ton and 30-ton furnaces is contained in the accompanying table.

DIMENSIONS OF 5-TON AND 30-TON FURNACE COMPARED.

	Old furnace.	New furnace.
Total capacity ..	5 tons	30 tons
Capacity per leg	2.5 tons	10 tons
Diameter of bath	2.1 meters	3 meters
Depth of bath..	27 cm.	45 cm.
Weight of core..	15 tons	23 tons
Number of primary turns per leg..	15	13
Weight of copper per leg	0.875 tons	ca. 4.5 tons
Total weight of copper	1.75 tons	ca. 13.5 tons
Energy used ...	250 kw.	700 kw.
Copper losses ..	12.3 kw.	40 kw.
Iron losses.....	18 kw.	18 kw.
Power factor ...	0.65	0.50
Voltage	250	230
Periodicity (½ alterations per second)...	12½	8
Amperes per phase	1,400	3,540
Kind of current	1-phase	3-phase

California Leads West in Mineral Production

California ranks first among the states west of the Mississippi river in the value of its mineral production, according to the United States geological survey. In former years California's claim to distinction as a mineral producer rested on its output of gold, in which, in fact, it held first place in 1911, although in recent years it has usually fallen behind Colorado in the production of gold. The premiership of gold in the state has, however, been succeeded by petroleum, the value of which in California exceeds that of gold by 94 per cent and gives the state first place among the states in the production of crude oil. California leads also in the production of asphalt, of platinum and of quicksilver and enjoys a monopoly in the production of borax and magnesite. It is second in the production of tungsten ores, third in the production of cement, and sixth in the production of copper and stands well up among the states in the production of a number of less important minerals.

The Gealy Wrench & Mfg. Co., Grove City, Pa., recently has built a large addition to its plant and considerable new equipment has been installed. The manufacturing facilities now are sufficient to more than double the previous output. To facilitate the sale of this pipe wrench, a miniature model is now built, weighing eight ounces, which can be carried by a salesman for demonstrating purposes. This model is an accurate replica of the larger wrenches and is made of the same quality of steel.

Electrification of an English Rolling Mill

How Exhaust Steam Was Utilized to Increase the Electric Generating Capacity—Rope Drive for the Mills

In an address delivered before the Staffordshire Iron and Steel Institute, at Dudley, Eng., on the "Electrification of the Shelton Mills", W. H. Lake said that these works consist of a sheet mill and 16, 12 and 10-inch merchant mills. Previous to the adoption of electric drive, the mills and auxiliary machinery were driven by engines furnished with steam from nine boilers connected to the heating furnaces, and five hand-fired boilers. It was obvious that a considerable saving could be effected both in fuel and labor by dispensing with the hand-fired boilers, and two methods of accomplishing this were suggested. First the efficiency of the mill engines could be so increased that the steam consumption would be reduced one-half. This method, however, would have continued the hand-fired boilers in service, instead of providing a preliminary step toward their removal, and also would have necessitated the installation of new boilers to provide steam at a higher pressure.

Other Methods

The second method was to connect the mills to a source of power derived from waste heat, which in this case could have been obtained from a neighboring blast furnace, but a consideration of this alternative showed that the saving effected would not warrant the necessary expenditure. Another source of power was found in the exhaust steam from the reversing mill engines of a neighboring rolling mill. This steam was being discharged into the atmosphere, and with the exception of the small amount required to heat the feed water, was available for generating electricity. The company operating this mill was considering means of increasing its electric power generating capacity at that time, and by the installation of a larger station than necessary for its own requirements, ample power was provided for the Shelton works.

When the mills of the Shelton works were changed to electric drive, a 350-horsepower direct current, compound wound, variable speed motor was installed to drive each mill. The 12-inch mill consists of one stand of three-high roughing and one stand of finishing rolls. The 10-inch mill consists of two stands of three-high rolls and two stands of two-high rolls. The power is transmitted to the mills from the motor by a rope drive, as shown in the accompanying illustration. The drive consists of 12 ropes, each 1⅜ inches in diameter.

Rope Drive

The rope wheel of the 10-inch mill is 10 feet, 6 inches in diameter, and weighs 10 tons. It operates at a speed of from 150 to 240 revolutions per minute. The old engine flywheel was utilized to equip the 12-inch mill. This flywheel is 9 feet, 8 inches in diameter, and weighs 15 tons. To carry the rope drive, a grooved pulley was also required for this mill. This pulley is 14 feet, 6 inches in diameter, weighs seven tons, and operates at a speed of from 90 to 150 revolutions per minute. The adoption of the rope drive for the mills may appear open to criticism, particularly for the mills driven at high speed, but it had the advantage of permitting the installation of duplicate motors and the variation in the speed of the two mills was obtained by the use of driving pulleys of different diameters. The arrangement of the mills was also favorable to rope drive, and they were both changed over to electric drive without a great loss of time. The disadvantage of the rope drive was the loss of power in the ropes, and this was largely offset by the greater efficiency of the high-speed motors.

The 10-inch mill was equipped with a disengaging coupling interposed between the rolls and the flywheels, which permitted the latter to be disconnected in case of accident.

Exhaust Steam Utilized

The source of power from the neighboring rolling mill was the steam formerly wasted by two simple, two-cylinder, non-condensing reversing mill engines, with cylinders, 50 inches x 5 feet, and 42 inches x 5 feet, respectively, and by four auxiliary engines. The steam for these engines was provided by seven hand-fired boilers and two other boilers fired by waste heat from the heating furnaces. The working steam pressure was 120 pounds per square inch. The only manner in which this steam was formerly utilized was for heating the feed water by direct contact in a suitable vessel from which the steam was discharged into the atmosphere.

In the new arrangement, the steam is exhausted as formerly to the feed water heater, which is no longer used in this capacity, but is connected to a main which conveys the steam to the accumulator. The latter is sufficiently large to bridge intervals of one minute in the supply of exhaust steam, when the turbine is working at full load. The accumulator is the lowest point of the system, which is, therefore, self-draining. To prevent excessive back pressure, a 20-inch relief valve is attached to the exhaust receiver; the mains also are of ample dimensions, being 2 feet, 6 inches to 3 feet in diameter. In spite of these precautions, however, there is generally an appreciable increase in the average back pressure, which increases the steam consumption of the mill engines. To compensate for this increased steam consumption, downtake superheaters have been added to the seven hand-fired boilers. These are of the double-flow type and are installed in the downtakes at the back of the boilers without protective dampers or by-pass valves. The superheat obtained at the boilers is about 120 degrees Fahr.

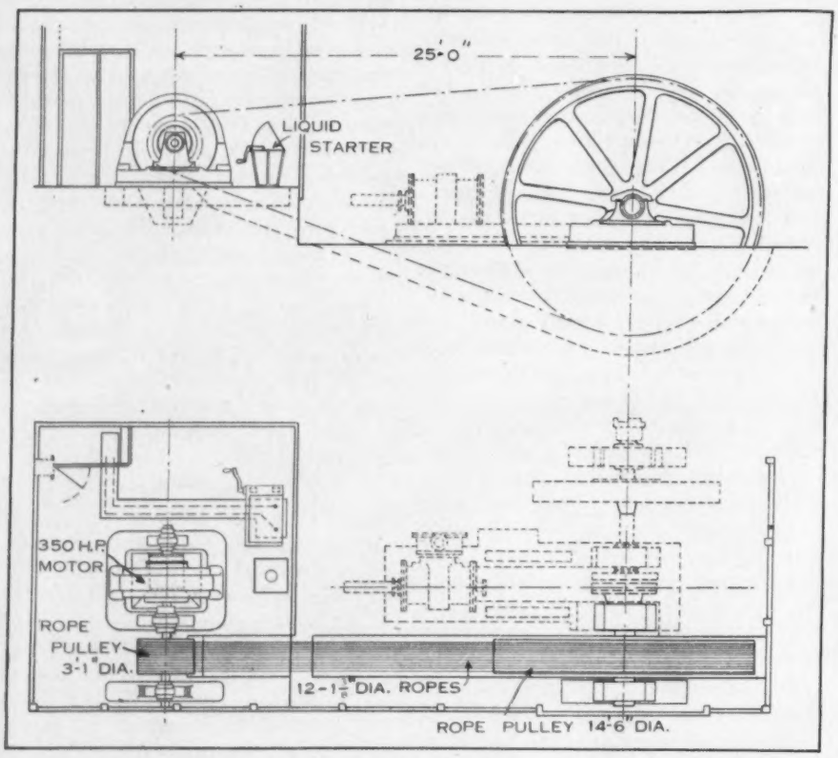
Power Plant

Power is generated by a 1,000-kilowatt, Westinghouse, impulse-bladed mixed pressure turbo-alternator, operating at 3,000 revolutions per minute, and generating current at 5,500 volts. The turbine is arranged to change over from exhaust steam to live steam before the pressure in the accumulator falls below atmospheric pressure to avoid the possibility of trouble from leakage of air into the exhaust mains and engines. The machine will carry an overload of 15 per cent on exhaust steam when exhausting to a 28-inch vacuum, and will carry overloads of 50 per cent, with live steam. The high and low pressure throttle valves are controlled by a powerful governor through a relay actuated by oil pressure, and additional control for the low pressure valve is provided by a relay controlled by the pressure of steam in the exhaust mains. The condenser is of the surface type and the tube area is 5,500 square feet. The cooling water is circulated through the condenser

and over the cooling tower by a motor-driven centrifugal pump. The air and water extraction pumps are driven by individual direct current motors at 500 volts. The motors can be started before the turbo-generator is placed in operation, by current from the old generating station which provides the week end supply.

Provision for Control

The connection between the turbo-generator and the switchboard is made by a three-core, paper insulated, double armored cable. The high tension switch gear is located in the basement, and is controlled mechanically from the switchboard on the station floor above. A connecting link between the 5,500-volt alternating system and the old 500-volt direct current system employed in the works is provided by a 500-kilowatt rotary converter, situated in the generating station. The current from this machine is controlled and distributed from the switchboard mounted in line with the alternating current board.



SIDE ELEVATION AND PLAN VIEW OF ROPE DRIVE FROM THE MOTOR TO THE MILLS

A three-phase 5,500-volt current is transmitted to the Shelton works by an overhead aluminum line. The line is suspended by a cradle of galvanized steel wire for the entire distance between the two plants. The terminal poles are of steel structural work and the intermediate poles are made of creosoted timber. At each terminal the line is connected to multiple-gap lightning arresters.

The Shelton sub-station is of steel and brick construction and is equipped with traveling cranes which operate on runways extending outside of the building. The current is controlled in the sub-station in a manner similar to the method employed in the generating station, and it is transformed to 500 volts direct current by a 500-kilowatt Westinghouse transformer.

A new system of heating the feed water was installed by the company from which the Shelton works derives its power. A portion of the feed water formerly was discharged from the surface condenser as distilled water, and the remainder was taken from the circulating water system through the softener. Steam is furnished by the accumulator to the heater, passing through a control valve specially designed to maintain a very slight pressure in the heater. This valve is controlled by a bell, with its edge infringing on the water in the same manner as a gas governor. The valve is practically free from friction and is very sensitive.

As the amount of exhaust steam in a plant of this kind fluctuates greatly, being sometimes greater than the combined requirements of the turbine and accumulator, some method had to be devised to utilize these peaks in the supply of exhaust steam, and thereby minimize the drain on the system in the intervals when exhaust steam was not available. To attain this end, two tanks, each of 650 gallons capacity, were installed in the line between the circulating water system and the softener. These tanks are connected with the accumulator and receive the surplus steam during the peak periods. To render the action automatic, the head of water over the outlets of the steam pipe is adjusted to allow the pressure of the steam in the accumulator to overcome the head just before it would lift the relief valve on the accumulator. Consequently, every peak in the supply of exhaust steam raises the temperature of the water in the two tanks to practically the boiling point, and the demands for steam for the water softener are thereby reduced. During the period required for the water to pass through the two tanks, there is generally a sufficient number of peaks in the supply of exhaust steam to raise the temperature of the water to about 200 degrees Fahr.

Reducing Valve

A reducing valve has been provided to carry live steam to the accumulator when the pressure falls below five-eighths of a pound per square inch. This arrangement permits of heating the feed water by live steam, when the supply of exhaust steam ceases, and the water-softening process continues uninterruptedly. When there is not sufficient exhaust steam to raise the pressure in the accumulator, the feed heater will take it and the turbine will work on live steam This is the more economical method in view of the very efficient use of live steam obtained with the turbine. When the exhaust steam is received in normal quantity, the turbine takes all it requires and the surplus steam heats a storage of feed water.

The small-arms factory at Lithgow, Australia, which is said to be the best equipped plant of its kind in the world, has been placed in operation. The buildings cost $258,000; the electric motors, which were made at the government works in Sydney, cost $44,000, and the equipment, furnished by Pratt & Whitney, cost $330,000. The capacity of the works is 50 magazine Lee-Enfield rifles and bayonets in an 8-hour day. At Enfield, it is stated, it takes 72 man-hours to turn out a rifle; 48 man-hours at the Birmingham small-arms factory, but only 22 hours, 37 minutes at the Lithgow works, and it is predicted that this will be reduced to 21 hours.

Granulating Blast Furnace Slag in England

By J. A. Seager

At blast furnace plants in Great Britain, the practice of granulating blast furnace slag for its subsequent utilization as road material, in concrete work, etc., is growing rapidly. Blast furnace slag which has been granulated by a stream of water possesses properties which render it not very adaptable to the manufacture of concrete bricks, inasmuch as slag contains upward of 30 per cent of water, and when used fresh, as much as 40 per cent. Therefore, for the manufacture of cement, it is necessary to remove the water by artificial drying, and owing to the spongy and porous nature of this material, the drying-out process usually covers a considerable period.

A plant which granulates and cools blast furnace slag without water is being installed at English works by Witting Bros., Ltd., London. An installation of the slag granulating plant made at the Buderus Iron Works, Wetzlar, Germany, is illustrated in Fig. 1, and Fig. 2 shows a side elevation and plan view of this equipment. The slag spout of the blast furnace extends into one end of a rotating drum, which is slightly inclined away from the furnace. As the slag is discharged into the drum, a jet of compressed air is directed against the slag stream in the drum, thereby granulating the slag and carrying it up to the top of the drum, as illustrated in the side elevation, Fig. 2. As the drum is only slightly inclined, the movement of the granulated slag to the discharge end is comparatively slow and, therefore, before reaching the end of the drum the slag is quite cool. This operation further is facilitated by a series of scoops or paddles in the drum which continuously turn over the slag, exposing it to successive air currents.

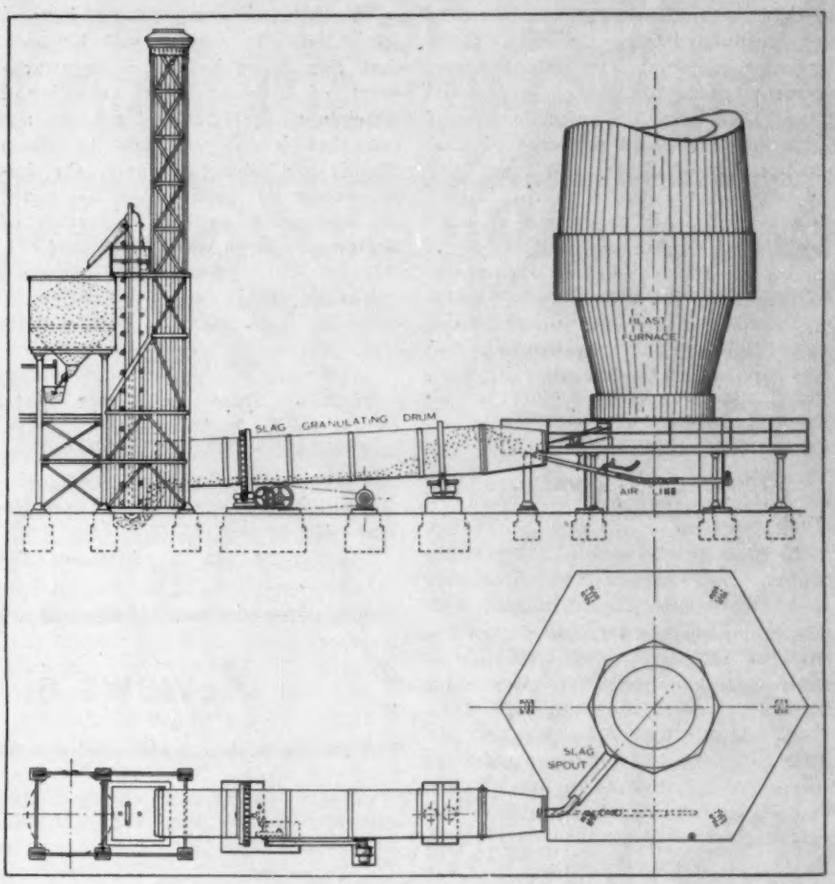


FIG. 2—SIDE ELEVATION AND PLAN VIEW OF THE SLAG GRANULATING PLANT

The slag is discharged from the drum into the boot of a bucket elevator and is conveyed to a storage bin, from which it can be discharged into cars. The lower end of the drum and the boot of the elevator are located inside a chimney shaft, which is carried to a considerable height to carry off the gases generated by the air-spraying process.

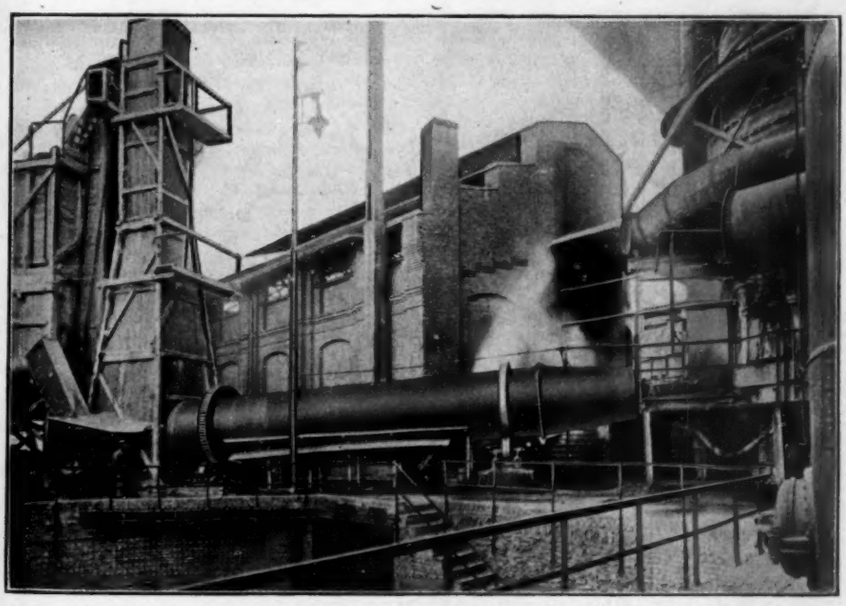


FIG. 1—BLAST FURNACE SLAG GRANULATING AND COOLING PLANT

Under certain conditions, however, when using dry compressed air, the molten slag may be blown into a thin, stringy, feathery-like substance, known as slag wool, and to overcome this, means are provided for adding a small percentage of moisture to the air in a sufficient amount to granulate the slag. The amount of moisture absorbed in this way is negligible and is practically dried out before the slag reaches the storage bin.

Air granulated slag has been used successfully without further preparation for making sand bricks in the proportions of 20 to 30 and 50 per cent of air granulated slag, 80 to 70 and 50 per cent of water granulated slag and 8 per cent of lime. Bricks made of a mixture of two-thirds of air granulated slag and one-third of water granulated slag, hardened for 12 hours under steam at a pressure of 120 pounds, show a compression strength of 7.4 pounds per square

inch. Cement made of a mixture of air granulated slag shows a slight increase in compression strength over cement made of water granulated slag. Tests made of cements composed of a mixture of 80 per cent of slag, 20 per cent of clinker and 1 per cent of plaster of Paris show the following results: Air granulated slag after drying in air and water for a period of 28 days showed a compression strength of 4,750 pounds, whereas, cement made from water granulated slag after 28 days storage had a compression strength of 4,402 pounds per square inch.

Production of Sound Ingots

To the Editor:

In the article entitled "Producing Sound Steel Ingots by Compression," contributed by Benjamin Talbot and published on page 936 of the Nov. 14, 1912, issue of THE IRON TRADE REVIEW, I note that reference is made to the system of obtaining sound ingots which I described in some recent papers before the Iron and Steel Institute. In this article, Mr. Talbot makes the following statement:

Sir Robert Hadfield suggests the use of a sinkhead to feed the pipe which forms by the shrinkage of metal from its liquid to its solid state. To do this effectively, some system must be adopted of keeping the surface fluid. There is no doubt that if this is carried out, the sinkhead will feed the ingot and the cavity will be in the head. The question to be decided with this method is whether it is commercially applicable to the large output required from a modern rail mill.

I do not understand Mr. Talbot's question because the system I have described already has been commercially applied to an output of approximately 15,000 tons of ordinary and special ingots. Even if compared with our large tonnages of today, this output cannot be considered small and so far as I know, there was not a single waster in this tonnage as a result of unsoundness or segregation. This reflects the high quality of the product and also indicates that it can be applied on the largest scale, such as that of the modern rail mill.

Mr. Talbot's statement to the effect that "Sir Robert Hadfield suggests the use of a sinkhead to feed the pipe" seems to imply that my system depends for its efficiency entirely on the use of a sinkhead. As a matter of fact, the sinkhead in one sense is to some extent secondary. I wish to emphasize that my method consists in the use of a sand head, an insulated layer of slag, charcoal and blast. It readily will be seen that this is unlike the mere attachment of a sinkhead to the ingot, which not only is an old method, but one that is too uncertain to attain the desired object, namely, the improvement of quality, the avoidance of segregation and the reduction of the present large waste in discard.

ROBERT A. HADFIELD.

London, Eng.

Book Review

Practical Sheet and Plate Metal Work; by E. A. Atkins; 534, 5 x 7¼-inch pages; illustrated; published by The Macmillan Co., New York City, and furnished by THE IRON TRADE REVIEW for $2 net.

This is the second edition of this book, revised and enlarged. It is said that every workman who aims to become proficient in sheet or plate metal working, should have a fair knowledge of practical geometry, mensuration and the properties of metals. These subjects are treated in a practical way by the author, who has attempted to emphasize the basic principles involved. The book contains 42 chapters and an index. The various chapters are devoted to such subjects as: Elbows for round pipes; tapered-pipe elbows and three-way pieces; conical articles of short taper; articles of unequal overhang; three chapters on roofing work; ventilator and chimney-pot bases, hoppers, etc.; metals and their properties; annealing, welding, etc.; sheet and plate metal working machines and tools. The illustrations number 450.

Reviews of New Catalogs

MACHINE SHOP AND FOUNDRY EQUIPMENT.—The Western Tool & Mfg. Co., Springfield, O., has issued a 100-page catalog, devoted to its extensive line of machine shop and foundry equipment, including tool-holders, mandrels, steel shop furniture, hack saws, lathe dogs, clamps, drill vises and holders, planer jacks, furnaces, snap flasks, molders' benches, etc.

PATTERN SHOP AND FOUNDRY SUPPLIES.—In a 32-page catalog, issued recently by the Shanafelt Mfg. Co., Canton, O., its extensive line of foundry and pattern shop supplies is illustrated and described. The various products shown are manufactured by this company and include leather and wood fillet, rapping plates, wood dowels, pattern letters, chaplets of various types, snap flasks, brushes.

DIAMOND DRILL SUPPLIES.—The E. J. Longyear Co., Minneapolis, has issued an attractive 64-page illustrated catalog and price list of its diamond drills and supplies. The manufacturing plant of the company is in Marquette, and the company makes several types of drills and all the supplies necessary in their operation. A well-arranged index adds to the convenience in finding articles wanted.

STEAM TURBINES. — The De Laval Steam Turbine Co., Trenton, N. J., has issued a 47-page illustrated catalog, describing its velocity stage steam turbines. These turbines are adapted to a wide variety of uses and the illustrations show them connected to centrifugal pumps, generators, forced draft fans, etc. All wearing parts, such as nozzles, buckets and guide vanes, are renewable without involving the renewal of other parts.

SMOOTH-ON CEMENT.—The Smooth-on Mfg. Co., Jersey City, N. J., has issued a 40-page, illustrated booklet, in which are shown many instances of the successful use of the company's iron cement in patching and waterproofing concrete structures of various types. These include cracks in concrete floors, engine pits, etc. The cement also is applicable to iron materials, and illustrations are also shown of repairs on leaky wrought iron sewer pipe.

TRANSMISSION MACHINERY. — The Dodge Mfg. Co., Mishawaka, Ind., has issued recently a 48-page illustrated catalog, including price list, of its extensive line of power transmission machinery. The latter includes safety collars, flange couplings, adjustable hangers and pillow blocks, countershafts, base plates, bearings, brackets, belt tighteners, friction clutches, wood and iron split pulleys, iron center wood rim pulleys and machine-molded iron pulleys.

CORE ROOM EQUIPMENT.—Five pamphlets, devoted to core room equipment, have been issued by the Wadsworth Core Machine & Equipment Co., Akron, O. The equipment discussed in these pamphlets follows: Vertical jar-ramming, core-forming machine, Wadsworth core machine, sand mixing machines, core cutting-off and coning machines, standard core prints, core testing apparatus and the Wadsworth-Detroit jar-ram, roll-over, box-lifting, core-making machine.

PIPE.—The National Tube Co., Pittsburgh, has issued a leaflet explaining the Spellerizing process employed in treating steel for pipe. This method consists of rolling the bloom in a mill equipped with rolls having regularly-shaped projections on their surface and then the bloom is subjected to passes in rolls having polished surfaces. In this way, it is claimed, the surface of the metal is worked so as to produce a uniformly dense texture, better adapted to resist corrosion, especially in the form of pitting.

ENGINEERING SUPPLIES AND MACHINES.—The Pearson Engineering Co., Boston, has issued an 18-page illustrated booklet, devoted to some of its products. The company makes and deals in hydraulic power transmission machinery, internal combustion turbine engines, air compressors and vacuum and liquid pumps. The illustrations include transmitters, controllers, blowers, pumps and engines. The reversible turbine engines are made to use either steam or hydro-carbon gas as the motive power.

MINING NEWS FROM THE IRON RANGES

Busy Season Next Year

Although the ore shipments from the Lake Superior region constituted a record this year, they undoubtedly will be exceeded next season. With the expiration on Jan. 1, 1915, of the lease held by the United States Steel Corporation, the Great Northern probably no longer will transport for that company such large amounts of ore. However, as the mines that revert will be operated either by the Hill interests or through an arrangement similar to that existing at present, and since the Hill interests are developing additional lands, the Great Northern's Mesabi range traffic will undoubtedly more than maintain its heavy volume. The Steel Corporation also will increase its shipments over its Duluth, Missabe & Northern and Duluth & Iron Range railroads, and orders are pending for 1,000 steel ore cars to be added to the equipment of the Missabe system within the next two years. The Great Northern, as well as the D., M. & N., will have double tracks to the head of the lakes, its loaded trains going out from the range over the same route as now and the empties returning via the Swan River line.

The work of stripping the Steel Corporation's Monroe mine, at Chisholm, is to be started soon, and the intention is said to be to utilize equipment lately in commission at the Hull-Rust property at Hibbing. In the same district Winston & Dear are engaged in stripping one of three mines, the development of which has been started by the Great Northern's subsidiary, the Arthur Mining Co. About 6,000,000 cubic yards must be excavated at the latter tract and the work will take two or three years. A prospective important stripping operation is the removal of the overburden at the Steel Corporation's Ark Terrace property, near Marble, at the western end of the range. This tract is counted upon to take the place of the nearby large Hill mine, one of the Great Northern properties to be surrendered. In Section 9, in the same vicinity, Pickands, Mather & Co. is reported to have a deposit which will probably be developed next season. While the Shenango Furnace Co. shipped approximately 1,500,000 tons from the Shenango pit and shaft and the Webb mine at Hibbing this year, it is the reported intention to produce 2,000,000 tons next season. About 1,000 men are employed at present and underground mining is being pushed vigorously.

Marquette Range Activities

The Cascade Mining Co. is increasing the working force at the Isabella mine, operations now being carried on with three 8-hour shifts, and 60 men will be employed by Jan. 1. The Isabella is a new mine, the first Marquette range enterprise of the Longyear-Pillsbury-Bennett interests, and operations for some time will be limited to shaft sinking. A depth of 100 feet has been attained with more than 700 feet of rock to be penetrated before the ore body will be opened. The first 40 feet of the shaft have been given a lining of concrete, and a steel headframe will replace the present wooden shafthouse, before actual mining is started. During the holiday season, operations at the Breitung company's Bacon mine, at Humboldt, will be suspended for a few days to permit the completion of a new headframe.

Oglebay, Norton & Co., of Cleveland, who recently resumed operations at the Buckeye mine, at Commonwealth, on the Menominee range, are now restoring the Berkshire property in the Iron River district, to the active list. The mine had been idle since the summer of 1911, but the stockpile of 30,000 tons had been shipped. The Wickwire Steel Co. has provided its Wickwire property, at Iron River, with a miners' change house, constructed of hollow tile, with concrete finish. The "dry" is 24 x 50 feet, contains 100 steel lockers and is provided with shower baths. The Republic Iron & Steel Co. has five diamond drills operating in the Iron River region, at the Sherwood, Aronson and Minckler tracts. Ore deposits are reported to have been found at the first two properties and the tracts have been leased and will be opened as mines. Two drills are being operated at the Minckler, the work being done under the supervision of Edward J. Pearce, chief mining engineer of the Republic company, that discovered the ore at the Sherwood after others had failed.

First Cuyuna Range Stripping

Arrangements are reported to have been completed whereby the first stripping on the Cuyuna range will soon be underway. George H. Crosby, of Duluth, acting for the Whitmarsh Mining Co., has transferred the Pennington mine, in Section 10, T. 46, R. 29, to the Tod-Stambaugh, company, well-known operators on the Mesabi and Michigan ranges. It is said that orders have already been issued for the assembling of the necessary stripping equipment, and that a steam shovel will be on the ground in a few weeks, to be followed soon after by another. The company is expected to open an office at Crosby, which will be the range headquarters. J. S. Lutes, who has been superintendent of the company's Biwabik mine on the Mesabi range, will be general manager of both the Biwabik and Pennington mines, the latter having been named in honor of Edmund Pennington, president of the Soo Line. The reported intention of the company is to ship 200,000 tons from the property next season. The development is an interesting one and is believed to have an important bearing on the future development of other properties on this range, heretofore regarded as outside the scope of stripping possibilities.

New Ore Development in Alabama

According to reports, a new company, the Self Fluxing Ore & Mining Co., is in process of formation to operate red ore mines near Oxmoor, Ala. The property was recently acquired by J. J. Shannon, J. H. McDonough, W. A. Porter and associates, and comprises 1,535 acres. Operations are expected to start about the middle of January, and a shaft will be sunk about that time. Machinery will be installed and sufficient development work done to permit a maximum production of 2,000 tons per day.

The Oliver Iron Mining Co. is said to be planning extensive improvements at its power plant on the Quinnesec river, Menominee range. Harrison G. Robey will be in charge of the work, and considerable additional power is expected to result.

THE IRON TRADE REVIEW

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The Stock Exchange a Public Trust

Recent movements in Wall street, promoted by the "bears", have naturally aroused much indignation among manufacturers who see the danger of Wall street pessimism disturbing legitimate business at a time when great prosperity prevails with the promise of indefinite continuance. The mental attitude of the business man who is not a speculator on the stock exchange is also likely to be affected by the disclosures being made by the congressional committee, which is investigating trading on the New York stock exchange. A great deal of the testimony relates, of course, to matters which have long been pretty well understood by the public. It was, for example, hardly necessary to show by witnesses that short selling is gambling and that many practices of a very questionable character are constantly carried on. But when a former president of the exchange takes the stand and displays a complete failure to recognize any duty to the community, an amazing illustration is furnished of how some men still fail to realize that the time is past when a man in any position of great influence can with impunity fail to recognize his obligations to the people at large. Mr. Sturgis would probably insist that public office is a public trust. He seems to be entirely oblivious to the fact that the administration of such an important concern as the stock exchange, with which the prosperity and happiness of millions of people are connected, carries with it a highly important duty to the public. Mr. Sturgis might have maintained his attitude years ago without having it seriously challenged, but the American people of today will never assent to the "public be ignored" policy any more than they will to the "public be damned" policy.

The recent investigation has called attention to the inquiry which was made by the commission appointed by Governor Hughes some years ago. That commission discharged its duties with great thoroughness and declared that while it had been unable to discover any complete remedy short of abolishing the stock exchange itself to correct the manipulations of the exchange, the members of the commission were convinced that the exchange could prevent the worst forms of the evils by properly exercising its influence and authority. "If wrong doing recurs," said the commission, "and it should occur to the public at large that the exchange has been derelict in exercising its powers and authority to prevent it, we believe that the public will insist upon the incorporation of the exchange and its subjection to state authority and supervision." Some attempts at reform were made after the Hughes commission reported, but recent disclosures show that to a large extent the old practices are still being conducted at the old stand. There is the same moral obliquity, the same lack of appreciation of the rights of the public. With greater force than ever, the question is being asked, How long will such conditions be tolerated by the American people? Sound morals and legitimate business demand that, after deliberate consideration, vigorous action shall be taken to suppress the evils disclosed by the Hughes and Pujo investigations.

The stock exchange, if allowed to exist, must be a public trust. Then will the men who govern it be compelled to be faithful or be subjected to the disgrace and punishment which are visited upon the man in public office who betrays his trust.

Hearings in the Metal Schedule

The announcement that the ways and means committee of the House of Representatives will devote two days to hearings on the metal schedule of the proposed new tariff bill shows that while the committee is more disposed to be reasonable than it was last winter, when the bill revising the metal schedule was passed without any hearings being held, it does not intend thoroughly to investigate conditions in the iron and steel business. Two days would, of course, be inadequate to hear even a few of the leading manufacturers of iron and steel products. Perhaps, however, it is just as well that the committee does not intend to give more time to the taking of testimony. It already has at its command an immense volume of testimony which was taken by the Penrose Senate committee about a year ago. If the committee will carefully digest the testimony taken at that time, it will be able to frame a bill which will be entirely fair to the business interests concerned.

The important fact, however, is that the coming Underwood bill is certain to be greatly modified by

the Senate. With the tremendous majority which he has at his back, Mr. Underwood can probably jam through the House almost any bill that the committee proposes. It will be a different story in the Senate. In the higher body, the members, ranked according to the parties which elected them, are equally divided, there being 48 Democrats and 48 men who were elected as Republicans. Of the Republicans, there are perhaps a dozen who cannot be relied upon to adhere to any party program. Most of these men have decidedly low tariff leanings. On the other hand, there is a strong element in the Democratic membership of the Senate, including Senator Simmons, of North Carolina, who will probably be chairman of the Finance Committee, which is opposed to any radical tariff legislation. The new south is not a free trade south and some of the southern senators can confidently be counted upon to vote against a measure which does not meet their approval. Democratic senators from northern states having important manufacturing industries which are now protected will also be found exerting a conservative influence. The real tariff battle will be fought next spring in the Senate, and we believe the Senate committee on finance can be depended upon to give ample opportunity to manufacturers to present their views. Any time and energy spent in attempting to influence the House is likely to have less effect than the same exertion would have later on the Senate committee and the Senate itself.

The Blast Furnace Coke Supply

It is interesting to recall the fact that at least a mild sensation was created a trifle over 11 years ago, when Charles M. Schwab, president of the then newly formed United States Steel Corporation, testified before the Industrial Commission at Washington that "If the consumption of steel increases in the future as it has in the past, I believe the Connellsville coal will be exhausted in 30 years." So fully did the iron industry of the north depend upon the Connellsville fuel that comment of the time ran largely to the question of whether the industry as a whole would not suffer a serious check, should the Connellsville supply be exhausted, as indicated.

Mr. Schwab's statement was made with full knowledge of the prospects of the Klondike, or lower Connellsville field, then being opened. The future of the by-product process, using other coals, was not so well understood. The steel industry has expanded fully as rapidly, in the past 11 years, as was to have been expected, but the probable life of the Connellsville region, while shortened, has not been shortened from 30 to 19 years, partly because the limits of the Connellsville region have been pushed farther out and partly because coke from other districts, largely by-product, has helped out.

What it is particularly important to reflect upon at this time is that the Connellsville region must no longer be expected to provide for expansion in the production of pig iron. Its remaining life must be devoted simply to a continuance of the supply it has been furnishing. It will not pay greatly to shorten its life by providing for a large annual increase in output. In recent years, indeed, its production has increased little, if any. The present weekly rate of about 400,000 tons is less than the rate in the early months of 1910, and is approximately equal to the average rate in 1906, when the year's output was about 20,000,000 tons, or an average for a full year of almost 400,000 tons weekly.

When necessity arises for a large increase in pig iron production, there is a rush to the Connellsville region for coke, and this time it has resulted in a price of $4 for prompt. The last rush was in the fall of 1909, but that rush barely produced $3 coke. If the production of pig iron is to continue to expand, the trade must find more coke elsewhere, and must begin providing for it in reasonable time. Many of the blast furnaces have been singularly slow in recognizing this fact, and are now seeing what would otherwise be a very comfortable profit in pig iron manufacture absorbed very largely by the payment of practically unprecedented prices for coke.

An Evening Up in Profits

The smaller producers of steel are now tending to even up in profits with the large producers. They are, as a rule, obtaining higher prices for their current shipments than are the large producers. The latter, on account of the magnitude of their operations and from a general difference in policy, are disposed to sell their product to a considerable distance ahead. The smaller producers do not, as a rule, sell so far ahead. Indeed, when prices were at their lowest last winter, some of them sold very little even for quick delivery, prices ruling being entirely unattractive.

As prices have advanced, the smaller producers have felt the advances more quickly, and in addition to that, many of them have been able to obtain premiums over the recognized market, through being able to make much quicker deliveries than their larger competitors. Through a double influence, therefore, their average realized prices on current shipments have been much higher than those of the large producers.

The large producers are generally admitted to have larger profits than the small producers, in proportion to the stages of manufacture which they conduct. Reference is not made here to the obvious fact that profits per ton of final output are larger the farther back the producer goes as to his raw materials, the suggestion being simply that for similar stages of manufacture there is a difference. By reason of greater flexibility, the smaller producers are now able to reap larger profits relatively, and thus they are tending to even up for disadvantages they may be under when prices are low and all material is being bought from hand to mouth.

MEN OF THE IRON TRADE

Hampton E. Tener has been elected to fill the vacancy on the board of directors of the International Steam Pump Co.

C. H. Ellis, formerly with the Tabor Mfg. Co., Philadelphia, has been added to the sales force of Henry E. Pridmore, Chicago.

George M. Wright, president of the Wright Wire Co., Worcester and Palmer, Mass., last week was elected mayor of the city of Worcester.

Charles C. Tyler, manager of the Union Metallic Cartridge Co., Bridgeport, Conn., has tendered his resignation, to become effective Dec. 31.

R. G. Stiles, who has been associated with the Stiles Mfg. Co., Parkersburg, W. Va., has been elected treasurer and superintendent of the Valley Machine Co., that city.

John Huchel, who has been foreman of the Standard Steel Car Co.'s plant at New Castle, Pa., has accepted a similar position with the Barney & Smith Car Mfg. Co., Dayton, O.

John McGill, formerly identified with the Collingwood Shipbuilding Co., and the John Inglis Co., Ltd., has been appointed assistant manager of the Berg Machinery Co., Ltd., Toronto, Ont.

Clifford M. Diehl has been appointed chief clerk at the Sharon, Pa., plant of the American Steel & Wire Co. He was transferred from the Rankin works of the company, at Rankin Station, Pa.

Virgil G. Bogue, a prominent New York engineer, has been retained as consulting engineer by the Canadian Pacific railway, in connection with the line through the Canadian Rocky Mountains. He has gone to Vancouver, B. C.

H. C. Raentgen, for the past four years representative for the Otis Elevator Co., at Youngstown, O., has been transferred to New York, effective Jan. 1. He will be succeeded by William Henry, who has been acting as his first assistant.

Louis C. Pautsch has been re-elected president of the Juno Motor Truck Co., Juneau, Wis. The company, which was formerly the Brodesser Motor Truck Co., Milwaukee, Wis., has just completed a prosperous year. Other officers re-elected at the annual meeting are Ferdinand Lindemann, vice president; Henry Hennig, secretary; Peter Peters, treasurer.

J. N. M. Shimer, late of L. & R. Wister & Co., Philadelphia, and general manager for the receiver of the Dunbar Furnace Co., has associated himself with Shimer & Co., having offices in the Bullitt building, Philadelphia, and the Oliver building, Pittsburgh.

Alfred Reeves, general sales manager of the United States Motor Co., is to leave that company to become vice president and general manager of the Hartford Suspension Co., of Jersey City, manufacturer of shock absorbers and other automobile accessories.

W. B. Dickson, formerly vice president of the United States Steel Corporation, has been made a director of the H. B. Worthington Pump Co. Mr. Dickson was recently elected president of the International Steam Pump Co., of which the Worthington company is a subsidiary.

C. L. Hastings has opened a manufacturers' agency in Pittsburgh, and is representing the Alloy Steel Casting Co., Wheeling, W. Va., manufacturer of carbon and alloy steel castings and composition steel ingots. He was formerly associated with the American Vanadium Co.

Albert N. Nash, a member of Crocker Bros., New York, who was injured while going through one of the Pittsburgh plants, the day following the banquet of the American Iron and Steel Institute, returned to his home in New York recently. He had been in the West Penn hospital.

Allan Strale has resigned his position as chief engineer at the Indiana Harbor works of the Inland Steel Co., which he has held for seven years, to assume a similar position with the H. Koppers Co., Chicago. He was formerly chief draftsman at the South Chicago works of the Illinois Steel Co.

Capt. Albert Hicks, organizer and former large owner of the Allegheny Steel Co., Tarentum, Pa., has disposed of his holdings in the Belmont Coal Mining Co., Glencoe, O., to Thomas K. Maher, vice president and general manager of the company. This action is said to have been made in connection with Capt. Hicks' intention to retire. The sale includes one-half interest in the Ashland Coal & Dock Co., Ashland, Wis.

Howard Shelton, of Shelton Bros., founders and machinists, Paducah, Ky., was elected treasurer of the Paducah Manufacturers' Association at its recent meeting. The organization is planning the second annual "Made-in-Paducah" exposition of the products of the city, to be held the latter part of this month.

John B. Coates has been elected secretary and superintendent of the Pittsburgh Malleable Iron Co., Pittsburgh. J. A. Botsford has been chosen treasurer of the company. The elections followed the deaths of E. P. Botsford, secretary and treasurer, who died Oct. 30 at Denver, Colo., and of George Rollings, superintendent, who died a month ago at his home in Grafton, Pa. Frank Moore continues as president of the company.

Samuel B. Lewis, veteran pig iron expert of Allentown, Pa., celebrated his 82nd birthday anniversary, recently. Mr. Lewis was born at Lehigh Furnace, Pa., and went to Allentown in 1846, when his father, the late Samuel Lewis, built the Allentown Iron Co.'s furnace at that place. It was at this time that anthracite coal was first used in the manufacture of pig iron. At this particular furnace, however, pig iron was made by the charcoal process. Mr. Lewis was superintendent of the plant when he retired 20 years ago.

C. M. Garland, formerly a member of the faculty of the University of Illinois and lately with the R. D. Wood Co., has become associated with Messrs. Woodmansee, Davidson & Sessions, consulting engineers, 1048 First National Bank building, Chicago, in the capacity of combustion engineer. The announcement of the appointment has just been made by the company. Mr. Garland has specialized in the gasification of fuels and the application of producer and water gas to industrial and power requirements. The firm of Woodmansee, Davidson & Sessions also announces that after Jan. 1, in addition to the present line of work, it will be open for consultation on the design and operation of producer and water gas apparatus, gas power installations, gasification of low grade fuels and the application of gas to the various heating problems.

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
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Birmingham, Eng., Dec. 7.

Pig Iron.—The scarcity of pig iron is more manifest than ever, with the result that every consumer is complaining of short deliveries. It is impossible to satisfy the demand for material. In the Sheffield district, the position has been aggravated by insufficient transit facilities. Many furnaces would be started, but for the high cost and scarcity of fuel. Prices eased a little during the week, apparently in response to European political complications. Yesterday's selling price for Cleveland warrants was 67s 3d ($16.46), a shilling below the highest of the year, which was on Nov. 18, sales then being on the basis of 68s 3d ($16.70). This is exactly 20s above the figure of a year ago. Sales have been made for the first half of next year at 68s. A very heavy demand is expected in the first quarter. Manufacture is carried on with great difficulty, owing to the great scarcity of coke. Small lots command fancy prices, and in the north of England, the probability of a fuel famine is being seriously discussed. There has been a considerable addition to warrant stock, during the past few days, but taking the month as a whole, the addition to stocks was only about 80 tons. The shipments have been considerably affected by the weather. They amounted in November to 90,000 tons, as compared with 110,000 tons a year ago. The amount in store at Cleveland is 250,000 tons. At some of the blast furnaces, great inconvenience has been caused by inability to get fuel and ore to meet daily requirements. At present there is practically no prompt iron available, though the nominal quotation has been 82s ($20.08). Next year's contracts are on the basis of 82s 6d ($20.20), and buyers count themselves fortunate if they can find furnacemen to accept orders for a long period at this price.

RUSSIAN IRON TRADE

St. Petersburg, Nov. 28. — The Russian situation is prosperous. There is no sign of weakness anywhere either in the Urals or in South Russia, where the only difficulty appears to be in the supply of coal, which is approaching famine prices and the necessity for it is so great as to make the Donets producers independent even of government patronage for the time. Prices remain high and still look upward. The demand at home owing to a general prosperous industrial situation remains excellent and shows no sign of weakening in its call on the productive power of the Donets iron works.

BELGIAN IRON TRADE

Brussels, Nov. 28.—Market conditions continue good in Belgium and the chief item to note this week is the fact that the advance of coke prices by 1 franc (19 cents) has resulted in pig iron being raised 1 franc (19 cents) per ton, foundry iron now being quoted 83 francs ($15.77) to 84 francs ($15.96), and Thomas 82 francs ($15.58) to 84 francs ($15.96). The undertone of the market for half and finished products continues good, and the mills throughout have in hand sufficient orders for the next three months. Fresh business, however, has of late been more restricted as a natural consequence of the political situation, but the opinion prevails that orders are only being held back, and that an early conclusion of peace would be followed by renewed activity. Meanwhile further irregularity in the price basis has developed. Plates eased 2 shillings (49 cents) for export to £6 16s ($33.10), iron bars are 1 shilling (24½ cents) to 2 shillings (49 cents) lower at £5 19s 6d ($29.07) to £6 1s ($29.44) and steel bars at £6 3s ($29.93) to £6 5s ($30.42).

GERMAN IRON TRADE

Berlin, Nov. 28. — The southwestern German iron market, according to a report from Saarbrucken, has not been uninfluenced by the trouble in the Balkans. New business with the fighting countries is suspended and some old orders are cancelled. Business with Italy is still restricted in spite of the peace. The home consumption is good. It is feared, however, that wages questions will trouble the industry in the spring of 1913. Bar iron can be called in good tone universally. There is no chance of reduced prices and the large producers are so confident of a continuance of the good business that the steel combination gives notice of an advance of 2.50 marks (58.75 cents) per ton for formed iron. Crude iron has never known such fine times here and finds a ready sale notwithstanding repeated advances in price. The same may be said of half products, for which the producers require long delivery periods. The business in girders is quiet with the approaching end of the year and the works are delivering promptly.

AUSTRIAN IRON TRADE

Vienna, Nov. 26.—At the meeting of the Austrian Iron Cartel, it was decided to leave unaltered the price of iron prevailing at present, as far as sales over the first quarter of 1913 were concerned, the uncertainty of the general situation being considered as justifying a waiting policy. During the course of the meeting, members of the Cartel reported a slight decline of fresh orders in Galicia, where credit is stated to be somewhat strained. From other districts of Austria, however, no diminution of orders was reported, wars and rumors of wars not having, as yet, exercised any restraining influence on the employment of capital.

FRENCH IRON TRADE

Paris, Nov. 28.—The Comptoir des Aciers Thomas has put up prices for the first half of 1913 by 10 francs ($1.90) per ton. The makers of finished and half products have thus the basis for their own price levels and will now be more disposed to accept orders for delivery next year. The market generally has undergone no material change, remaining active and firm almost throughout; and political developments, apart from making buyers somewhat cautious and limiting fresh business, have had no effect, late prices being fully maintained. Bar iron is now quoted 2.50 francs higher (47½ cents) in the Centre and Loire district at 207.50 francs ($39.42½), and 2.50 francs (47½ cents) to 5 francs (95 cents) higher, in the Meurthe and Moselle at 210 francs ($39.90) per ton.

Timely Topics Discussed by Business Leaders

Panama Canal Expected to Have Important Influence on Foreign Trade — Future of By-Product Coke — Some Tariff Views

Philadelphia, Dec. 16. — Interesting opinions on a number of important subjects were expressed by men prominently identified with the iron and steel and coke and machinery industries in this city when interviewed last week by a staff representative of THE IRON TRADE REVIEW.

C. R. Hoopes was asked what he thought about the subject of tariff revision so far as it pertains to the iron and steel industry. Mr. Hoopes is president of the Hoopes & Townsend Co., the oldest bolt, nut and rivet manufacturer in this section of the country, it having been founded in the year 1849.

"The position of the iron and steel industry is so strong at present," said Mr. Hoopes, "that a careful revision ought not to harm us. But I do believe it would hurt us all if they weaken the position of some other industries, like the textile business, for instance. There is no use in throwing over the ladder we all climbed up on."

Future of By-Product Coke

M. R. Gano, head of the firm of J. K. Dimmick & Co., believes that the future of the by-product coke ovens throughout the country, and particularly in the east, is a very bright one.

"The average cost of Connellsville coke at present, delivered to eastern furnaces, is $7.40 per ton of pig iron produced," said Mr. Gano. "That is, figuring the average freight rate from the Connellsville district to the various eastern furnaces at $2 per net ton, and figuring the coke used in the proportion of 2,200 pounds for each ton of pig iron. The ability of the Connellsville operators thus arbitrarily to charge any price which they think the market will bear is rapidly forcing blast furnace owners either to install their own by-product coke oven plants or make arrangements whereby they can economically purchase by-product coke from nearby ovens.

"Some of the by-product plants now existing in the east are those of the Philadelphia Gas & Electric Co., which furnishes coke for the Delaware River Steel Co.; the Lehigh Coke Co., which supplies the Bethlehem Steel Co., and those of the Maryland Steel Co., Camden Coke Co., Pennsylvania Steel Co., Lackawanna Steel Co. and the Cambria Steel Co. Inasmuch as all these plants have made good to the satisfaction of their operators, there is no reason why such ovens should not be installed on a constantly increasing scale. By-product coke, on an average market, is at least 50 per cent cheaper than Connellsville coke, both delivered at the furnace, and this does not include any allowance for the income derived from the sale of the by-products."

Mr. Gano was asked what effect the general adoption of by-product coke by blast furnaces would have on the business of coke dealers.

"That is very simple," said Mr. Gano. "The wide-awake ones have made or are making arrangements for the sale of coal, replacing in this way the portion of their business lost in the falling off of coke sales."

"What do you think about the possibilities of the foreign market for American coke?" Mr. Gano was asked.

"We exported 300,000 tons last year, mainly to British Columbia and other parts of Canada, and to Mexico, South America and Spain. While we cannot do anything at today's prices, there is no reason why, in a normal market, the export movement should not constantly increase in volume."

Mr. Gano was asked if he expected the opening of the Panama canal to have an influence on the amount of coke exported.

"Yes, it should," he replied. "A great deal of coke, used chiefly in smelting copper ores, goes to Chili and to points on the Gulf of California and the western coast of Mexico. This will be sent by way of the Panama canal."

Mr. Gano made some observations regarding the pig iron market, which, he said, is confronted with a peculiar condition at present.

"On account of the abnormal and fictitious prices ruling on Connellsville coke," said Mr. Gano, "it is a very hard proposition for a blast furnace man to know what arrangements to make in disposing of next year's output of pig iron."

Machine Tools Abroad

F. F. Espen, president of the Espen-Lucas Machine Works, manufacturer of cold saws, cutting-off machines, boring mills, etc., this city, was asked several questions regarding the cost of manufacturing machinery abroad, compared to the cost in this country. Mr. Espen believes that a reduction in the tariff on machine tools would undoubtedly result in great damage to the business of manufacturers of a number of lines of machinery in this country.

"At present," said Mr. Espen, "foreign manufacturers of at least a few lines of machinery are in such a position that they could import their product, and, in spite of the duty, compete with American manufacturers right in their own market. The tariff, however, has effectually served to keep the foreign houses from getting a hold here. Following a reduction we could expect a lot of foreign competition to come in immediately, and there are a great many manufacturers in our line abroad, there being from 15 to 20 in England alone. The market for standard tools and for boring mills especially would be affected. The Germans are well advanced in the manufacture of this machinery.

Foreign Advantages

"Foreign manufacturers," continued Mr. Espen, "have two advantages over us in establishing low prices: They do not have to pay such high prices for labor and, as a rule, they do not turn out such high-grade machines, in the standard lines, as we do. This is very candidly admitted abroad. Frequently we receive requests from foreign concerns for a bid on some kind of a machine, drawings and specifications to accompany the quotation. As we seldom hear from them again, it is our belief that they adopt the designs and make use of them for their own trade. In an advertisement which I saw in a recent issue of a German trade paper, a German manufacturer called attention to the fact that his cold sawing machine was designed along American lines and manufactured according to our methods, 'thus giving it the appearance of an American-made machine.'

"In regard to our export trade," said Mr. Espen in reply to another question, "we ship machinery to Canada, South America, Japan, Brazil, Mexico and other countries. Canada is our most important foreign market and the demand for cold saws from Canadian steel foundries and structural fabricating plants has been especially active the past year."

NEW SMELTER

Will be Installed in Sudbury District by Dominion Company.

The Dominion Nickel Copper Co., a Canadian corporation controlled by J. R. Booth, of Ottawa, and M. J. O'Brien, of Montreal, has decided to install a smelter in the Sudbury district. This company about five years ago purchased from the Hamilton (Ont.) syndicate extensive holdings on the North nickel range and within the past year has added to its properties greatly by the purchase of the Murray mine and the properties of the Lake Superior Corporation on the South range. More than $300,000 have been spent in diamond drilling on the company's properties and the tonnage developed is said to be between 3,000,000 and 5,000,000. The recent explorations on the Murray mine have particularly been successful. The company now has ore reserves second to those of the International Nickel Co., and certainly sufficient for many years' operation.

The new smelter, it is proposed, will have an initial capacity of 1,000 tons of ore daily. It will be located on Whitewater lake in the township of Snider, about six miles northwest of Sudbury, and not far from the Copper Cliff smelter of the Canadian Copper Co. It is proposed to make an 80 per cent matte and to refine either at the smelter or at some place in Canada to be determined. The process of refining to be used is not announced. The company is independent of the International Nickel Co., "the nickel trust," so-called, which operates through the Canadian Copper Co. The only other operating company in the district is the Mond Nickel Co., an English company, which ships its metal to Wales, to be treated by the Mond process to produce nickel salts and metallic nickel. At present, the Canadian Copper Co. produces about three-fourths of the output of the district, and the Mond company one-fourth. The district produces about 80 per cent of the total nickel supply of the world.

Practically all of the American nickel is supplied from the Sudbury district by the International Nickel Co. There is a duty of 6 cents a pound on the importation of refined nickel, but the ore and the 80 per cent matte come in free. As a result, all of the American nickel is produced at Oxford, N. J., from matte shipped in from Sudbury.

Bought Iron Mine.—The Republic Iron & Steel Co., Youngstown, O., has purchased the Aronson iron mine property near Iron River, Mich., from Power & Geary, drilling contractore, of Hibbing, Minn. Five drill holes are down on the property, some to the depth of 1,100 feet. All are bottomed in ore. It is probable that the mine will be developed soon.

IRON PRODUCTION

In Canada Last Year Shows Large Increase.

Ottawa, Can., Dec. 17.—While the production of iron and steel in Canada last year increased nearly 15 and 8 per cent respectively over that of the previous year, the output of iron ore decreased, as shown by the annual report of iron and steel production in the Dominion, the advance chapter of which has just been issued. The total Canadian production of pig iron last year was 917,535 short tons, valued at $12,307,125, as compared with 800,797 short tons, valued at $11,245,611, in 1910. The production of steel ingots and castings was 882,396 tons, as compared with 822,284 tons in 1910. The total shipment of iron ore from Canadian mines was 210,344 tons, valued at $522,329, as compared with 259,418 tons, valued at $574,362, in 1910. The rate of production has shown practically no increase during the past 12 years, while the production of pig iron is nearly 10 times that of 1900.

The assistance granted by the federal government to the Canadian iron and steel industries in the form of bounties ceases on Dec. 31, when the bounty on pig iron and steel made in electric furnaces will no longer be paid.

Orders Public Sale Southern Iron & Steel Co. Property

E. H. Dryer, United States referee in bankruptcy, has ordered a public sale of the property of the bankrupt Southern Iron & Steel Co., Birmingham, Ala. The sale will be made at public auction on the steps of the Jefferson county, Alabama, court house, Jan. 31, 1913.

Suspends Schedules

An order has been entered by the Interstate Commerce Commission suspending from Dec. 13 to June 13, all the schedules in tariffs containing rules and regulations governing diversion, reconsignment and other privileges on coal, coke, iron ore and other commodities handled at Detroit. The rules which have been suspended, if permitted to go into effect, would result in material advances.

CRUCIBLE STEEL PLANT

Of Baldwin Steel Co. Improved and Again in Operation.

The crucible steel plant at Charleston, W. Va., which became idle upon the death of Samuel Bowne, of New York city, two years ago, has been improved and again put in operation in recent months by a newly-organized company under the former name of the Baldwin Steel Co., and further extensions of capacity are now being made. The officers of the new company are Joseph Krieg, president, and J. C. Pape, vice president. The former plant and site, comprising 20 acres, was purchased last June and an additional tract of 10 acres was also acquired for future enlargement. The melting equipment of the plant consists of two crucible furnaces, one of 24 pots and one of 30 pots capacity. The rolling mill department includes one 10-inch train and one 12-inch train for cold rolling of rounds and flats and the forging department is fitted with seven steam hammers, ranging in capacity from 500 to 6,000 pounds. The company has installed new annealing and tempering furnaces, rebuilt the crucible furnaces, and fitted out the finishing department with new stands of cold rolling and cold drawing equipment. A crucible steel foundry has also been installed in an addition about 60 x 100 feet, of concrete block construction, for the manufacture of light machinery and alloy castings. The company has also built its own crucible-making department, in which it uses German, English, Chinese and a small portion of domestic clays. In this respect it is one of the few works in the country manufacturing its own crucibles from imported clays. The plant is equipped with a well-fitted laboratory, testing machine department, machine shop, pattern shop and steam power plant in which natural gas is used. The present capacity of the works is about 500 tons monthly of carbon steel, high speed steel, vanadium spring steel, chrome, nickel and alloy steels and high grade wire mill products. A New York office has been established at room No. 435, 30 Church street, which is in charge of Mr. Pape, and a warehouse has been opened at 6 Platt street, New York.

To Increase Price.—It is rumored that the stove manufacturers of Canada have decided upon a 10 per cent increase in the price of stoves, furnaces, fire-places, etc.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, buyers of machinery have shown a fair amount of interest during the past week, notwithstanding the near approach of the end of the year, when attention must be given to stock taking. There has been a decrease in business, compared with recent weekly totals, however. Sentiment is still optimistic among dealers, it being exceptional to encounter any but encouraging views of next year's business conditions. The Norfolk & Western railroad bought a few machine tools for prompt delivery. These are in addition to the list that has been before the trade for some time and which, it is expected, will be closed before Jan. 1. The Pennsylvania railroad for the lines west of Pittsburgh is reported to be preparing specifications for 1913 requirements and will probably submit them to the trade next month. The Boston & Maine railroad has distributed the long-expected list of specifications for the Bellerica shops. The list includes more than 300 items of shop equipment and exceeds in both number of requirements and value, any list appearing in the east during the current year. The amount involved is approximately $500,000.

In Pittsburgh, machine tool builders advise that there is a rather unusually heavy demand for electrically-driven drills, reamers and grinders. Although no large sales have been made, single orders for all types of electrically-driven machinery represent a good volume of business in the aggregate. The Pennsylvania railroad is reported to be gradually closing its large list which was presented the trade last fall. Despite the fact that the usual year-end lull is being experienced, there is little or no complaint heard among the machine tool representatives in that territory.

In Cleveland, conditions in the machine tool trade are quiet and the lull in buying that set in some weeks ago, was even more strongly marked during the past week. The dullness always apparent in the closing weeks of the year, is largely responsible for the decreased buying, but some dealers find in the uncertainty of manufacturers, concerning the probable action of the incoming administration and congress, an even stronger cause for the cessation of the buying movement. Few orders were placed during the week, and those largely for single tool lots. The machinery makers around Toledo shared in the distribution of the Pennsylvania railroad order that is being gradually closed. The lull is expected to continue until after the first of the year.

In Cincinnati, the machinery market has been quieter during the past week than for some time. This is attributed to the holiday season, and also to the fact that machine tool makers are awaiting the outcome of the special session of congress. The lists of three large railroads which have been expected for some time, have not appeared, but they will probably be issued soon after the first of the year. Radial drills continue in demand, and drills also are in fair demand. Some of the larger shops have begun to take an inventory of their stock.

New Construction

The Pennsylvania Steel Co. is improving its iron foundry at Steelton, Pa., to handle a larger tonnage.

The Queen City Steel Castings Co., Cincinnati, will build an addition to its plant.

The Ballach Smelting & Refining Co., Newark, N. J., will erect a one-story frame factory, 20 x 48 feet, on the Newark Bay front.

The Canada Screw Co., Hamilton, Ont., is having two small additions, each 80 x 40 feet, built as an addition to its plant.

The Brand Stove Co., J. P. Baumgarten, Milwaukee, Wis., vice president, will build a stove manufacturing plant to cost $100,000 at Regina, Sask.

The North West Brass Foundry Co., Montreal, Que., is preparing plans for the construction of a foundry at Calgary, Alta.

The National Iron Works, Ltd., is having built at Toronto, Ont., a foundry for the manufacture of 60-inch cast iron pipes.

The Emerson-Brantingham Co., Rockford, Ill., will establish a factory in Brandon, Man., to manufacture agricultural implements.

The Petrolea Motor Car Co. plans an addition to its automobile factory at Petrolea, Ont. A by-law will be submitted to the tax payers to grant a $10,000 bonus for the extension.

R. F. Greene & Co. is building an addition to its foundry and machine shop at Kingsville, Ont., and will need new foundry and machine shop equipment.

The Quebec Structural Steel Co., Ltd., will next spring build a steel manufacturing plant to cost $300,000 at Quebec, Que. The company will manufacture structural steel beams.

An addition will be built to the shops of the Illinois Central railroad at East St. Louis, Ill., which, when completed, will give employment to 1,000 to 1,500 more men. The railroad has announced that work will be begun within four months. The improvements will cost approximately $1,000,000.

The Link-Belt Co., Indianapolis, Ind., has prepared plans for a new forge plant. The building will be one story, brick and steel construction, 48 x 158 feet.

Plans are being prepared by the Danville Malleable Iron Co., which was recently incorporated with a capital of $150,000, to build a plant at Danville, Ill.

The Devore-McGormely Engineering Co., Toledo, O., has been awarded the contract for the erection of a $125,000 warehouse for the Avery Machine Co., at Minneapolis, Minn.

An extension is being built to the plant of the Clarage Foundry & Mfg. Co., Kalamazoo, Mich., which will be about 60 x 80 feet, and will be used as a storeroom.

The Northwestern Malleable Iron Co., Milwaukee, Wis., has been granted

a building permit to erect an addition to its annealing department at a cost of $15,000. The addition will be of concrete and brick construction.

The Williams Mfg. Co., Ltd., Montreal, Que., which was recently reorganized, will make extensions immediately to permit of an increased output of the sewing machines and typewriters it manufactures.

Fuller & Robinson, 95 State street, Albany, N. Y., have prepared plans for a two-story machine shop, to be erected for J. D. Hurd, 42 Beaver street, that city. The building will be of brick, 60 x 160 feet in dimensions.

The New York Edison Co. has bought the entire block fronting on University place, between Twelfth and Thirteenth streets, New York, for the purpose of erecting a large distributing plant.

Two buildings, each 60 x 100 feet, are being erected by the Atlas Crucible Steel Co., Dunkirk, N. Y. A. H. Hunter is president of the company. The Union Builders' Association, F. A. Anderson, secretary, secured the general contract.

J. A. Schroder & Sons, Inc., Brooklyn, N. Y., have filed plans for a seven-story factory to be erected on Claremont avenue, that city. The building will be 90 x 208 feet, constructed of brick and steel, and will cost about $150,000.

The McNaull Boiler Co., Toledo, O., will let contracts within a few days for the construction of a two-story office building to be erected near the manufacturing plant recently completed on Front street. The building will be 30 x 40 feet.

The Budd Mfg. Co., Tioga and C streets, Philadelphia, is having plans prepared for a three-story factory building, 75 x 500 feet, to cost about $100,000. The company is a manufacturer of steel automobile bodies. Rankin, Kellogg & Crane, Philadelphia, are the architects.

Included in the plans for the buildings of the Letchworth village, which will be established by the state of New York, at Thiells, is a machine shop and a power plant. Frank A. Vanderlip, president of the National City bank, New York, is president of the board of managers.

The Standard Steel Construction Co., Ltd., financed by Canadian and American capital, has bought 36 acres of land near Welland, Ont., and has in course of erection a plant which will be in operation in February. It will have an initial capacity of about 500 tons of finished material a month. A large tonnage of stock material has been ordered to provide for prompt shipments of steel work for buildings, bridges and other structures. E. O. C. Kuhnel, formerly manager of works for the McClintic-Marshall Construction Co., Pittsburgh, is president of the new concern.

The Joseph Joseph & Bros. Co., Cincinnati, dealer in scrap iron and metals, will soon build an addition to its plant on Harrison avenue. The new building will be 80 x 101 feet, with an ell 96 feet in depth, and will be two and four stories high. It will be of reinforced concrete, and will be used as a warehouse.

Baker & Co., manufacturers of platinum wire and specialties, New Jersey avenue, Newark, N. J., will erect a factory on Murray street, that city. Frederick A. Phelps, architect, Union building, Newark, prepared the plans, which call for a structure 50 x 188 feet, three stories high. The estimated cost is $80,000.

Announcement has been made by the Rendigs-Lothman Co., large dry goods dealer, Cincinnati, O., that it will erect a 10-story fireproof building on the ruins of the old property on Fourth avenue, between Vine and Walnut streets, in the near future. The old building was destroyed by fire last week. The new building will contain 60,000 square feet of floor space.

Four more stories will be added to its eight-story reinforced concrete building at Third avenue and Jefferson street, Louisville, Ky., by the Tyler Hotel Co., that city. The construction of a 12-story annex, immediately adjoining, is also planned. Owen Tyler, Tyler building, Louisville, can give definite information relative to the exact time of building, cost and preliminary details.

The Holt Mfg. Co., Stockton, Cal., has purchased 17 acres in New York, on the old Plank Road, for about $5,500 an acre. A two-story concrete and steel building, 160 x 160, will be built at once for temporary use as a factory and will be later converted into a storehouse. Several buildings will be erected for the manufacture of the Holt caterpillar gas tractor.

It is reported that the Chicago & Northwestern Railroad Co. is considering the purchase of an additional quarter section of acreage at Janesville, Wis., upon which to build shops and yards to be occupied by the departments at present located at the Fortieth street yards of the Northwestern at Chicago. The company now operates large shops and yards at Janesville.

An extension, consisting of three furnaces of 40 tons capacity each, is being added by the John A. Roebling's Sons Co., Trenton, N. J., to its open-hearth department. A four-story steel and brick addition to the company's wire cloth department, 76 x 270 feet, was only recently completed at the Roebling, N. J., plant. The construction program for next year has not yet fully been determined.

The Wabi Iron Works, Ltd., founder and machinist, New Liskeard, Ont., advises THE IRON TRADE REVIEW that it has secured six acres of land and is erecting a concrete foundry and machine shop. The company expects to spend $30,000 in new buildings and new machinery. The machine shop will be 40 x 100 feet and the foundry 60 x 60 feet. Fixed taxation and other favors were secured from the town.

Plans have just been completed for rebuilding the plant of the Toledo Metal Furniture Co., Toledo, O., which will double its present size. The plant will have a floor space of 50,000 square feet. The main building will be a concrete addition to the press room. The plating and polishing rooms will be enlarged and a large amount of new machinery will be installed. The concern manufactures metal furniture of all kinds.

Water Works

A waterworks system will be constructed at once in Jackson, Ky., a franchise for that purpose having been granted to Col. T. G. Stuart, Winchester, Ky.

Extensive additions to its water system are under consideration at Winchester, Ky., by the city council.

Power Plant Equipment

A 200-kilowatt generator and mining machinery will be installed early in the coming year by the Clear Creek Coal Co., Providence, Ky.

Boilers will be required by the Loose Leaf Warehouse Co., Greensburg, Ky., which proposes to increase its capital stock $10,000 and erect an additional warehouse and a redrying plant.

Power and other machinery will be required for the equipment of a cold storage plant which the Henderson Mining & Mfg. Co., Henderson, Ky., proposes to construct and operate in connection with its ice plant.

It is reported at Mt. Sterling, Ky., in connection with the recent sale of the Mt. Sterling Water, Light & Ice Co., that city, that the Dix River Power Co. is contemplating the con-

struction of a large hydro-electric power plant at the mouth of the Dix river, which will supply power to the several plants recently acquired by the Kentucky Utilities Co.

The board of aldermen of Covington, Ky., is considering the erection of a municipal electric lighting plant, and has appointed a committee consisting of W. A. Byrne, George Beach and W. T. Smith to investigate the proposition.

The plant of the Indianapolis, Columbus & Southern Traction Co., Columbus, Ind., will be considerably extended, and additional power machinery installed, under the new management which recently leased it. T. A. Wilson is president.

Considerable improvements will be made at Evansville, Ind., by the consolidated company resulting from the merger of the Evansville Public Utilities Co., the Evansville Gas & Electric Light Co. and the Evansville & Southern Indiana Traction Co.

The Ottawa Electric railway, Ottawa, Can., contemplates street extensions for next spring requiring an outlay of $30,000. Twenty new pay-as-you-enter cars of steel construction are being built to cost $160,000, and a steam auxiliary turbine has been ordered for the power plant at the Chandiere at an estimated cost of about $200,000.

Bridge News

Saskatoon, Sask., has prepared two plans for a bridge across the Saskatchewan river. One calls for a concrete pier steel bridge costing $337,000, the other for a concrete bridge.

An order for 5,000 tons of steel, to be used principally in bridge construction work, was placed last week by the St. Louis & San Francisco railroad.

The county commissioners of Pike county, Troy, Ala., will erect a bridge over the Conecuh river. Bids were received until Dec. 10 by State Highway Engineer W. S. Keller, Montgomery, Ala.

The Roanoke Bridge Co. has secured the contract for erecting a bridge over the Cumberland river at Pineville, Ky., for about $15,000. The bridge will give access to the new Louisville & Nashville passenger depot.

It is expected that work will be begun in the spring on the proposed $4,000,000 bridge across the Ohio river at Metropolis, Ill., as the Chicago, Burlington & Quincy railroad has now secured sufficient river frontage at that point.

The Nashville Bridge Co., Nashville, Tenn., has just secured the contract for the erection of the largest bridge in Mobile county, Alabama. It is to be of the draw-span type, and is to be swung across Dog river at a point 2,000 feet from the Gulf of Mexico. Especially strong construction will be required in the bridge on account of this proximity, which will subject it to the gulf storms.

Plans have been prepared for the substructure and superstructure of a bridge to cross the Fox river at West Algoma street, Oshkosh, Wis., and bids will be advertised for in the near future. The bridge will be 600 feet long, including a Scherzer rolling lift bridge of 118 feet center to center of end bearings. It will have one 28-foot roadway and two 6-foot sidewalks. The bridge will be of plate girder construction throughout and will require 700 tons of steel and machinery. The Scherzer Rolling Lift Bridge Co., Monadnock block, Chicago, is the engineer on the entire work.

Machine Tools

Among railroad machinery lists which are still pending is that of the Elgin, Joliet & Eastern Railway, and a part of the requirements of the Chicago & Milwaukee. A considerable portion of the latter has been closed.

The list of specifications for equipment at the Bellerica shops of the Boston & Maine railroad was distributed to machine tool dealers in Boston and New York last week. More than 300 items are included in the list which is the largest to appear before eastern dealers this year. The approximate amount involved is $500,000. Bids are requested with as little delay as possible, and awards will be made not later than February. Delivery will be required by June 1.

New Buyers

Under the name of the Vis Mfg. Co., D. Vis has started a machine job and repair shop at 232 Huron street, Grand Rapids, Mich.

With a capital of $100,000, the Zouri Drawn Metals Co., Chicago, has been incorporated by Harry R. Hurlburt, Frank Peska and Mabel L. Porter.

The Savannah Iron Works, Savannah, Ga., has been incorporated with a capital stock of $5,000. The incorporators are W. E. Tuck, J. A. Pruitt, G. C. Cobb and H. P. Cobb.

The Hamilton Malleable Iron Co., Ltd., Hamilton, Ont., will carry on under Canadian charter and with $610,000 capital, the trade of ironmaster, steel maker, converter, colliery proprietor, miner, smelter, etc. Messrs. Strachan Johnston, Reginald Holland Parmenter, Arthur John Thomson, William S. Morlock and Norman Baillie Wormwith, all of Toronto, are the incorporators.

The Von Wyck Machine Tool Co., Cumminsville, Ky., has been incorporated with a capital stock of $20,000, this being the first step toward enlargement of the concern. The incorporators are Philip Fosdick, C. F. Kern and J. H. Clermont.

Frank T. Murray, Charles W. Paltzer and Frank S. Righeimer, all of Chicago, have organized the Brown-Lewis Railway Co., with a capital stock of $2,500, to manufacture motor, tractor and trailer trucks and steel products.

The William Thompson Printers' Machinery Co. has been organized at Chicago, with a capital stock of $2,500, by William Thompson, J. Edgar Thompson and Henry Parsons. The company will manufacture printing machines.

The Craig Engineering Co., Chicago, recently incorporated with a capital stock of $20,000, will manufacture boiler and engine specialties. The company was incorporated by Albert E. Massey, George W. Jackson and William L. Barteau.

The Salisbury Metal Culvert Co., Salisbury, N. C., has been incorporated with a capital stock of $25,000. Officers are: President, Col. John S. Henderson; vice president and general manager, F. F. Smith; secretary and treasurer, H. A. Rowzer.

Boynton & Plummer, Inc., Worcester, Mass., manufacturers of machinists' tools, have been changed from a Maine to a Massachusetts corporation and reorganized with Fergus A. Easton as president; W. J. H. Nourse, treasurer, and Matthew G. Fitzpatrick, director.

The manufacture of steel buckets, steel pipes and similar products will be undertaken by the Kentucky Metal Products Co., recently incorporated at Louisville, Ky., with a capital stock of $30,000. The incorporators are Garner E. Dalton, Owen Tyler, James F. Fairleigh, Alfred C. Krieger and Nicholas H. Dosker.

A. H. Ahlberg, sole owner of the Camden Copper Works, 559-601 South Second street, Camden, N. J., advises that the recent incorporation of the company was made because of the business advantages to be gained. The business consists of building all kinds of copper work and also some iron and brass machines.

The Canadian Morris Iron Co., Ltd., Quebec, Que., will carry on with Dominion charter the trade of general founder, machinist and engineer. The

company will have $50,000 capital and the following incorporators: Messrs. Louis Harry Gaudry, Joseph Marc Gaudry, Thomas Gil Leonard, Joseph Ahern and Lilian Ferguson, all of Quebec.

The Lima Crucible Casting Co., Lima, O., was taken over by a new stock company last week, and improvements are to be made and the force of employes increased. The new company includes B. F. Thomas, J. L. Simpson, G. S. Geinbolt and others. Edward Beachler and Thomas C. Pennell, members of the old company, retire.

The Koehler Mfg. Co., Hudson, Mass., has been incorporated with a capitalization of $100,000, to engage in the manufacture of miners' lamps, igniters, etc. Ernest F. Koehler, Hudson, is president of the company, with Irving E. Bigelow, Worcester, treasurer, and A. J. Smith, Melford, Mass., a director. The company has secured an option on a factory at Marlboro.

The Railway Signal Co. of Canada, Ltd., has been incorporated at Ottawa, Ont., with $1,100,000 capital to manufacture and deal in all kinds of machinery and appliances for railway and other purposes. The incorporators are Henri Gerin-Lajoie, K. C. Alexandre Lacoste, Thomas John Shallow, Joseph Emile Cote and Joseph A. Marion, all of Montreal, where the main office will be situated.

Magnesia Products, Ltd., a newly-organized Montreal, Que., company, will take over the mines and plant of Canadian Magnesite, Ltd., which are situated near Calumet in Argenteuil county, Que., and also the Magnesia Products Co., Newark, N. J., the largest manufacturer of magnesite products in the United States. A plant for the manufacture of machinery, etc., will also be erected at Montreal, shortly.

The Chateauguay Garden City Co., Ltd., Montreal, Que., capital stock $100,000, has been incorporated at Ottawa, Ont., by Jean Baptiste David Legare, Joseph Victor Desaulniers, Joseph Cleophas Lamenthe, Joseph D. Tessier, and Joseph L. Duplessis, all of Montreal. The company, among other things, will act as agent for the purchase and sale of machinery, tools and other appliances for development purposes.

Carroll-Wilson, Ltd., Toronto, Ont., has been incorporated at Ottawa, Ont., with $300,000 capital stock to manufacture and deal in furnaces, stoves, ranges, basins, sinks, water pipes, and to act as machinist, galvanizer, annealer, plumber, etc. Louis Edward Carroll and John Campbell Wilson, manufacturers; and Reginald Holland Parmenter, Arthur John Thomas and William S. Morlock, all of Toronto, are the incorporators.

The Middle States Co., Erie, Pa., recently incorporated with a capital of $60,000, will deal in molding sand, foundry supplies, tools and mill machinery, as well as operating at Erie a foundry for the manufacture of light brass, bronze, iron, steel and aluminum castings of all kinds. The officers of the company are: President, M. W. Brundage; vice president, Edward F. Shugart; secretary and treasurer, W. J. Fargo. The board of directors comprises Edward F. Shugart, chairman; Frank E. Brundage, W. J. Fargo, M. W. Brundage and Arley J. Magee.

A new company, of which S. P. Pryor, St. Louis, is president, has purchased the Decatur Car Wheel & Mfg. Co., Birmingham, Ala., operating plants in Birmingham, Atlanta and Savannah, Ga. W. J. Morrison and W. M. Nubert, who were principal stockholders in the Decatur company, have disposed of their holdings. C. T. Esdale, general manager of all the plants of the company, with headquarters in Birmingham, announces that there will be no change in management or organization. The Decatur Car Wheel & Mfg. Co. has been operating successfully in Birmingham for about 20 years.

Lea-Courtenay Co., Inc., engineer and manufacturer, 90 West street, New York City, advises that it was recently incorporated with a capital of $50,000. The company takes over the engineering and manufacturing business of Albert G. Lea, New York, who has turned over all unfinished contracts. The company will manufacture high-duty turbine pumping machinery for all classes of service and will also have a department for the manufacture of cold metal sawing machinery. The officers of the company are: President, Albert G. Lea; Courtenay R. Rothwell, vice president and general manager, and Edgar W. Heller, treasurer.

The Erie Steel Construction Co., Erie, Pa., which was recently incorporated, advises THE IRON TRADE REVIEW that structural steel will be fabricated at its plant. The company has purchased property near Erie, on which is a building sufficient for present needs. As soon as it is found necessary to have larger buildings, the company will be able to fabricate and erect them. The next six months' requirements of machinery have been practically purchased. Structural steel for all purposes will be fabricated and erected, excavating and concrete work done and piles sunk where necessary. The officers of the company are as follows: President, W. E. McCain; vice president, G. H. Strayer; secretary and treasurer, W. C. Hoffman. The erection business formerly conducted by Messrs. McCain and Strayer has been taken over by the new company.

New Incorporations

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Wheeler Bros. Brass Foundry, of Troy, N. Y.; $15,000; Joseph Wheeler, Bella Wheeler and Henry Wheeler.

The Praco Mfg. Co., Cleveland; manufacturing lamps and auto specialties; $15,000; H. G. Smith, J. C. Hipp, T. J. Smith, Tony Laness, Dan Pfahl.

Federal Steel Sales Co., Cleveland; $5,000; E. E. Andrews, Joseph L. Spitz, L. G. Jones, T. J. Shauter and Herbert Fisher.

The George Stant Machine Works, Connersville, Ind.; capital, $30,000; directors, George H. Stant, Kyle E. Stant and Anna L. Stant.

The Paterson Iron & Metal Co., Paterson, N. J.; deal in iron, steel, metals, etc.; capital, $50,000; J. Jacobs, Y. Botwick, A. Bramson.

Geiger-Poisz Construction Co., Camden, N. J.; shock absorbers and improved wheels for automobiles; capital, $100,000; J. C. Geiger, W. F. Poisz, A. M. Garrison.

Ohio Automatic Sprinkler Co., Youngstown, O.; $50,000; Everett L. Thompson, Geo. Carlton Comstock, W. G. Allen, I. M. Shively and M. O. Mather.

New Process Gear Corporation, Syracuse, N. Y.; gears, machinery, etc.; capital $1,000,000; T. E. Meachen, Onondaga Valley; A. T. Vossburgh, T. G. Meachen.

The Republic Electric Co., Cleveland; electrical machinery, motors, etc.; $10,000; Louis Griesses, A. S. Mann, Solomon Peakind, Edna LaHarte, G. E. Mann.

The Elyria Belting & Machinery Co., Elyria, O.; machinery, belting, shafting, etc.; $10,000; Alex Altfeld, H. A. Pounds, J. C. Ross, Nettie Atfield and Hazel K. Ross.

The Steelback Ladder Co., Cleveland, O.; manufacturing ladders; $50,000; M. L. Bracken, W. C. Bracken, Eabert Baase, A. L. Lawrence, E. M. Nickels.

Pawson Engineering & Construction Co., Palmyra, N. Y.; $100,000;

electrical engineering; Philip Weigel Jr., Ralph E. Greeley, N. R. Van Booskirk.

American Commer Truck, Inc., Manhattan, N. Y.; manufacture auto trucks, machinery, etc.; capital, $10,000; incorporators: Raymond C. Thompson, Julius Kahan and Edward C. O. Thomas, all of New York City.

The Art Electrotype Foundry Co., Cleveland; printing plates of all kinds; capital, $10,000; Mathias J. Hinkel, Charles T. McCarthy, Frank M. Finucan, Anthony J. Fitzpatrick, Clarence M. Hinkel.

Rector Engine Corporation, Manhattan, N. Y.; manufacture machinery; capital $150,000; incorporators, Edward Gore, Wm. Magowan, both of New York, Samuel C. Yeaton, Brooklyn.

Rolaff Oil Carburetor, Inc., Manhattan, N. Y.; manufacture and sell carburetors; capital $25,000; Richard Wolfsky, 312 W. 114th street, New York City; James L. Bertis, W. G. E. Rolaff, Westbury, L. I.

The Leipsic Mfg. Co., Leipsic, O.; manufacturing brass, iron and aluminum goods; $25,000; Thomas H. Rower, A. A. Slaybough, W. A. Bell, Ashley H. Huffman, Walter S. Stevenson.

The R. M. Bailey Co., Philadelphia; capital stock, $45,000; to manufacture, sell and deal in and with iron, steel and other metals, castings, etc., F. R. Hansell, Philadelphia; George H. B. Martin, S. C. Seymour, Camden, N. J.

F. W. Ofeldt & Sons, Inc., Manhattan, N. Y.; motor trucks, etc.; capital $20,000; Ernest G. and Frank A. Ofeldt, Nyack, N. Y.; Edward Y. Eltonhead, 2508 Broadway, New York city.

Aluminum Castings, Ltd., Ottawa; capital, $40,000; to manufacture aluminum and other metallic products; provisional directors, Thomas H. Sedley, Robert M. Kerby, Robert G. Code and others.

Currie-Livock, Ltd., Ottawa; capital $40,000; to manufacture plumbing, heating and hardware supplies, etc.; provisional directors, Albert H. Currie, James Livock, N. J. Gareau and others.

Cowan & Britton, Ltd., Gananoque, Ont.; capital, $200,000; to manufacture builders' hardware and plumbing supplies; provisional directors, Arthur J. Thomas, Wm. S. Morlock, Norman B. Wormwith and others.

The Kells Motor Radiator Corporation, Manhattan, N. Y.; manufacture and deal in motor radiators for autos, auto motors, etc.; capital $650,000; Henry R. Bingham and Alexander F. Carbe, both of New York City; Cornelius A. Cole, Hackensack, N. J.

The American Floor Surfacing Machine Co., Toledo, O.; machinery, tools and mechanical appliances; $1,000; Charles G. Cunningham, Lloyd T. Williams, Raymond T. Garrison, G. C. Wilcox and Mell Sullivan.

The Peterborough Machine & Lubricator Co., Ltd., Peterborough, Ont.; capital, $600,000; to manufacture dies, tools, motors, engines, etc.; provisional directors, Edgerton R. Wilson, Ethel M. Wilson and Alexander Gillespie.

Fidelity Rope Splicer & Coupling Co., Inc., Buffalo; manufacture and deal in dumb waiters, hardware and supplies, etc.; capital, $10,000; incorporators, Thomas J. McFarlane, John B. VanHook, both of Buffalo, Joseph W. Salhanick, Portland, Me.

Holland-American Engineering Co., of 137 South Lasalle street, Chicago, Ill.; to manufacture electrical machinery, tools, etc.; authorized capital $20,000; T. F. Parker, O. Laage Jr., E. S. Massey, C. E. Hamill and L. J. Potter.

General Industrial

The Bryden Horse Shoe Co., Easton, Pa., has increased its capital stock from $750,000 to $5,275,000.

Additional air fans will be installed in its shaft by the Princeton Mining Co., Princeton, Ind. The mine is shut down for this purpose.

An increase in capital stock from $70,000 to $110,000 has been made by the Ingle Machine Co., Rochester, N. Y.

Federal Judge Arthur Tuttle, sitting in Bay City, Mich., has named the Detroit Trust Co., Detroit, receiver for the Flanders Motor Cycle Co. and the Flanders Mfg. Co.

The Independent Tire Co., of Guelph, Ont., has ordered five carloads of machinery from the Farrel Foundry & Machine Co., of Ansonia, Conn.

An increase in capital stock from $150,000 to $300,000 has been made by the Punxsutawney Iron Co., which operates a blast furnace at Punxsutawney, Pa.

Owing to the increased demand for castings, Confer, Smith & Co., Inc., Hamburg, Pa., have enlarged several departments of their plant and installed a 15-ton cupola.

The Warren Iron & Steel Co., Warren, O., has been reorganized and the capital stock will be increased soon. Samuel Siddall, Warren, has purchased an interest in the company and has been appointed secretary and treasurer. D. L. Helman will continue as president and general manager, while C. B. Loveless, formerly secretary and treasurer, becomes vice president. The company rolls saw and shovel plate and makes a specialty of discs and coulters for agricultural implements and steel heads for land rollers.

The Piggins Motor Truck Co., Racine, Wis., which for many years has been engaged in the construction of automobile engines and parts at Racine, and since 1910 has been building complete cars, is considering several offers from western cities to move its plant.

The International Steel Co., it is expected, will begin operating the works of the former Western Steel Corporation, at Irondale, Wash., in about 30 days.

The Pittsburgh Piping & Equipment Co., a Pennsylvania corporation with an authorized capital of $150,000, has filed articles and a statement to do business in Wisconsin. The interest there is given at $5,000.

A suit asking for the appointment of a receiver for the Wakeman Iron & Wire Works was recently filed at Norwalk, O. The suit was brought by John J. McMann, A. B. French and Ben Barnes.

The 18-inch mill at the east works of the American Iron & Steel Mfg. Co.'s works in Lebanon, Pa., has gone on double turn for the first time in years, the extra force being needed to handle pressing orders.

The American Screw Co., Hartford, Conn., has bought two lots of land at Stampers and Hughes streets, adjoining the present plant of the company. It will be held for future development.

The Brazil Sheet Metal Co., Richmond, Ind., has nearly completed improvements to its plant and machinery is now being installed. The company expects to be operating shortly with a double capacity and a greatly increased working force.

As assignee of various claims against the company, R. L. Wray has filed a bill at Chicago, asking the appointment of a receiver for the Strouse Automatic Stoker Co., against which he holds an unsatisfied judgment for $55,583.

Complete electric-drive equipment has been purchased of the James Clark Jr. Electric Co., Louisville, Ky., by the Steel Scaffolding Co., Evansville, Ind., the installation consisting of 10 induction motors, ranging in size from 5 to 10 horsepower.

The American Floor Surfacing Machine Co., Toledo, O., advises that, having been incorporated in another

state, it has simply reincorporated in Ohio. Having its own plant it will not do any building or make additions and will not install additional machinery.

The Optenberg Iron Works, Sheboygan, Wis., has recently made a number of increases in its equipment and working capacity in order to be better able to fill its contracts. The company is taking some large contracts for structural work, this being a new feature of its activities.

C. A. Pope has been awarded the contract for installing machinery at a new electric plant for the town of Arlington, S. D. The plant will be a 220-volt, direct current system, using a 40-horsepower Prim oil engine and a 30-kilowatt generator and storage battery.

The Shurfoot Horseshoe Corporation, manufacturer of horseshoes, New York City, has filed a petition in bankruptcy, with liabilities $9,837 and nominal assets $126,180. The company was incorporated Jan. 13, 1911, with a capital stock of $100,000, which was increased to $250,000 on July 26, 1911.

Thirty engines per month will be the capacity of the new Canadian Pacific railway repair shops at Calgary, Alta., which will be finished at the end of the year. The erecting of these shops has called for an expenditure of $2,000,000. The Grand Trunk railway shops at Transcona, B. C., will commence operations by Jan. 1.

The land, buildings and machinery of the English McKenna Co., Ltd., at Birkenhead, Eng., have been sold to the Boult, Sons & Maples, Liverpool, Eng., according to a dispatch from the latter city. The machinery was sold piecemeal, and the auction of the assets followed an order of the receiver appointed some time ago.

A dispatch from San Francisco, Cal., states that the Union Iron Works will undertake the construction of 10 cars for the Geary Municipal railway. This will relieve the W. L. Holman Co. of a portion of its responsibility for constructing the entire 43 cars needed for the operation of the Municipal railway.

J. J. Drummond, who represents a company which operates iron mines in Gloucester county, N. B., and Torbrook, N. S., held a conference a few days ago with the city council of St. John, N. B., in regard to the establishment at Courtenay bay of a steel plant, in which Norton, Griffiths & Co. are also said to be interested.

The stockholders of the Davis Sewing Machine Co. Dayton, O., at a meeting last week, authorized a $600,000 bond issue to be used in part for the purchase of additional machinery and equipment contingent on the proposed enlargement of the motorcycle department. Additional buildings will shortly be erected.

The Henry Vogt Machine Co. has sold to the Paducah Box & Basket Co., Paducah, Ky., two 6 x 16-foot boilers, of the type in which the company specializes, and to G. C. Hallauer, Marshall, Ill., two of the same type, 6 x 18 feet. A number of these boilers have been sold and installed recently by the company.

The Pittsburgh Cold Rolled Steel Co., Pittsburgh, has called a meeting of stockholders for Feb. 11, at which time a vote will be taken on a proposal to increase the capital stock from $50,000 to $150,000, enabling the company to extend its business. Stockholders will meet at the company's office, 1514 Oliver building.

The American Blower Co., Detroit, has been awarded a contract to supply 10 large mine fans for ventilating the shafts of the Pond Creek Coal & Coke Co., Williamson, W. Va. The fans will have a capacity of 200,000 cubic feet of air per minute. Each fan will make a carload shipment exclusive of motors.

Several improvements are planned by the Des Moines Silo Mfg. Co., Des Moines, Ia., which has increased its capital stock from $50,000 to $150,000. The company is also considering the opening of a branch in the lumber country. Last year it shipped 585 cars of silos out of Des Moines, and received 325 cars of steel, iron and lumber.

The West Bend Aluminum Co., organized at West Bend, Wis., only a year ago and now operating a large aluminum works, has received a proposition from the Commercial Club, of La Crosse, Wis., to move to La Crosse. The inducements advanced are such that the West Bend company is seriously considering the removal.

The Canadian Car & Foundry Co., Ltd., Montreal, Que., reports that it has at the close of the present year unfilled orders to the amount of $16,000,000. The annual meeting of the company took place in Montreal, Que., last week when a surplus of $1,056,334.25 for the year was reported. The company has under way extensive works at Fort William, Ont.

The Kenton Hardware Mfg. Co., Kenton, O., has purchased the plant of the Jones & Bixler Mfg. Co., Freemansburg, Pa., and will remove the equipment to Kenton. Both plants manufacture toys and according to officials of the Kenton Hardware Mfg. Co., the concern will now be the largest firm in the world manufacturing iron toys exclusively.

The Baker Mfg. Co., Evansville, Wis., manufacturer of windmills, pumps, feed mills and galvanized wire, has consolidated its branch plants at Witchita and Atchison, Kan., and Booneville, Mo., into a central distributing point at Kansas City, Mo., and will take possession of quarters leased in the latter city before the first of the year.

The Kansas City, Missouri River Navigation Co. advises that it is not doing any extensive work at its new yard, and will require no new equipment at present. The yard has been moved from Gasconade, Mo., to Kansas City, and a new machine shop 32 x 60 feet is under construction, in which the machinery from the former location will be installed.

The Scranton Bolt & Nut Co., Scranton, Pa., has completed the erection of a new building about 140 x 50 feet, two stories, of brick and reinforced concrete, to relieve the congestion in its shop department and provide a separate machine shop. In doing this, the company has made provision for a cooper shop and pattern shop. No other improvements are contemplated.

A statement issued by the board of directors of the J. I. Case Threshing Machine Co., Racine, Wis., says that sales during the past year showed an increase of 35 per cent over the corresponding period a year ago. The company is at present engaged in the construction and equipment of new shops, foundry and buildings, estimated to cost in excess of $1,500,000. They are located in Lakeside, Racine, adjoining its large motor car works, formerly the Pierce Motor Co.

The Economy Foundry Co., with works at Portage La Prairie, Man., and office at Winnipeg, advises that it is now operating a foundry, manufacturing light and heavy gray iron castings. The company also intends to operate another cupola on semi-steel castings. It is making machine castings of every description, heavy sewer castings, water works supplies and structural castings for buildings. In addition to its foundry the company has a well equipped pattern shop and machine shop.

The Gunnell Machine Co., Manitowoc, Wis., has received notice that the Panama canal commission has issued orders specifying the use of the Gunnell automatic coupler for steam, compressed air and water hose, in all work on the canal. The device is the invention of Elias Gunnell, of the

Manitowoc Shipbuilding & Drydock Co., Manitowoc, who is the principal owner of the Gunnell Machine Co. The company has been rushed to its utmost capacity for many months to fill orders for the government and other purchasers.

William B. Melish, who has been receiver of the Armor Steel Foundry Co., Cincinnati, O., announces that the company has gone out of business. The plant was sold to the Cincinnati Car Co., which will not run a steel foundry, but will manufacture steel street cars. The foundry will be dismantled and the equipment sold. John E. Jones, president of the Armor company, died recently in Chicago, and Mr. Melish states that the affairs of the company probably will be wound up and the corporation dissolved.

The Stiles Mfg. Co., Parkersburg, W. Va., has been taken over by the Valley Machine Co., that city. The business will be continued under the name of the Valley Machine Co., and wood-working machinery, special machinery and machine work, gray iron, brass and aluminum castings will continue to be manufactured. The officers of the Valley Machine Co. are: President and general manager, James Turpin; vice president, B. B. Putnam; secretary, John Marshall; treasurer and superintendent, R. G. Stiles. The board of directors includes the officers and Fergus C. O'Connor.

Tinius Olsen & Co., Philadelphia, manufacturers of testing machines and presses, whose incorporation was noted in THE IRON TRADE REVIEW last week, advises that there will be no change in the policy of the corporation. Tinius Olsen, inventor of the Olsen testing machine, who has developed the testing machine industry from its foundation, will be president of the company, and Thorsten Y. Olsen, former manager, will be vice president and treasurer. A number of improvements are being made at the company's plant, while others are under consideration.

The Mesta Machine Co., Pittsburgh, manufacturer of gas and steam engines, condensers, rolling mill machinery, etc., has been enjoying one of the best years in its history. Orders for miscellaneous steel castings; cut and machine molded gears; sand, steel and chilled rolls, and sundry rolling mill machinery are being received in good volume and give assurance that the plant of the Mesta company at West Homestead, Pa., will operate at practically maximum capacity for the entire year of 1913. As announced two weeks ago, the company is making an attractive addition to its plant and has erected an overhead bridge extending from railroad and trolley stations to the main entrance, making it unnecessary for pedestrians to endanger their lives by crossing a string of railroad tracks. The Mesta company has recently taken an order for three horizontal tandem, four-cycle gas engines from the Canadian Car & Foundry Co., Montreal, Can. These engines are of 800 horsepower and will operate on producer gas. The company is also completing an unusually large roll lathe for export to Italy. These two orders indicate the demand for American-built engines and machinery in other countries. Other orders taken recently include: Three Mesta horizontal tandem, four-cycle gas engines to the Alpha Portland Cement Co., Cementon, N. Y., of 800 horsepower capacity operating on producer gas; a 108-inch barometric condenser for the Youngstown Sheet & Tube Co., Youngstown, O., and a large shear for the Bethlehem Steel Co., South Bethlehem, Pa. The company recently has shipped a 44 and 84 x 60 Mesta high speed operating engine to the Shenango Furnace Co., Sharpsville, Pa., to which the first engine of the Mesta make was shipped last month. A 108-inch barometric condenser was recently shipped to the Carnegie Steel Co.'s plant at Mingo, O.

Fires

Fire recently caused a damage estimated at $10,000 at the plant of the Central Boiler & Heating Co., Grand Rapids, Mich. Henry Brobst, that city, owns and operates the plant.

The large molding plant of the Canada Machinery Corporation's branch plant at Hespeler, Ont., was burned last week, the loss being $20,000.

The coal sheds of the Nova Scotia Steel & Coal Co., Quebec, Que., were destroyed by fire with $20,000 loss, last week.

The serious fire, which badly damaged several blocks in Cincinnati last week, wiped out the district sales offices of the Cambria Steel Co. in that city. It is understood that a new location for the office will shortly be announced.

Fire on Dec. 15 broke out in the loft of the office building of the Allegheny Steel Co., Pittsburgh, which is located at Brackenridge, Pa., and practically the entire building was consumed, together with valuable papers and records. The company announces that if any of its customers fail to receive replies to letters lately addressed to the company, to forward copies of such correspondence to the company.

Miscellaneous

A by-law will be submitted to St. Thomas, Ont., tax payers in January for street railway extension to cost $18,000.

The contract for building a steamboat for the Bermuda Transportation Co. has been awarded to the Downey Ship Yard & Construction Co., Brooklyn. The steamer will ply between Hamilton and St. George, Bermuda, and will carry about 900 passengers.

An appropriation of $2,800,000 to pay for the equipment recently ordered by the Boston & Maine railroad, has been approved by the directors of the company. Of this sum, $2,000,000 will be used to cover the recent purchase of 100 locomotives and $800,000 will be for miscellaneous items.

The first vessel to be launched from the yards of the C. Hegewald Foundry Co., New Albany, Ind., since the civil war, is nearly completed. The vessel is a steel barge, and several more ships of similar type will be built by the Hegewald company for the government.

The Monticello Gas Co., recently incorporated at Monticello, Ky., with a capital stock of $50,000, by Porter Bros. & Cilley, of that place, plans to increase its capital stock to $500,000, and will build an 8-inch or 10-inch gas line from Monticello, where it has large gas development, via Burnside, Somerset and Stanford, Ky., to Danville, Ky.

Trade Notes

The Bickford Machine Co., Cincinnati, has placed on the market a new machine for threading taps.

The Oxweld Acetylene Co., Chicago, announces the removal of its general offices in that city, to the company's new works at Thirty-sixth street and Jasper place.

An engine lathe having a swing of 21 inches and capable of accommodating work 6½ inches wide in front of the face plate in the gap has been brought out by the Willard Machine & Tool Co., Cincinnati.

The Automatic Sprinkler Co. of America has begun the removal of its business from Syracuse, N. Y., where the main office has been located, to the new plant now nearing completion at Youngstown, O. Several weeks will be consumed in completing shipments and dismantling the Syracuse plant, which gave employment to about 60 men, some of whom will go to Youngstown, where the business will be increased. The company began business in Syracuse about 20 years ago.